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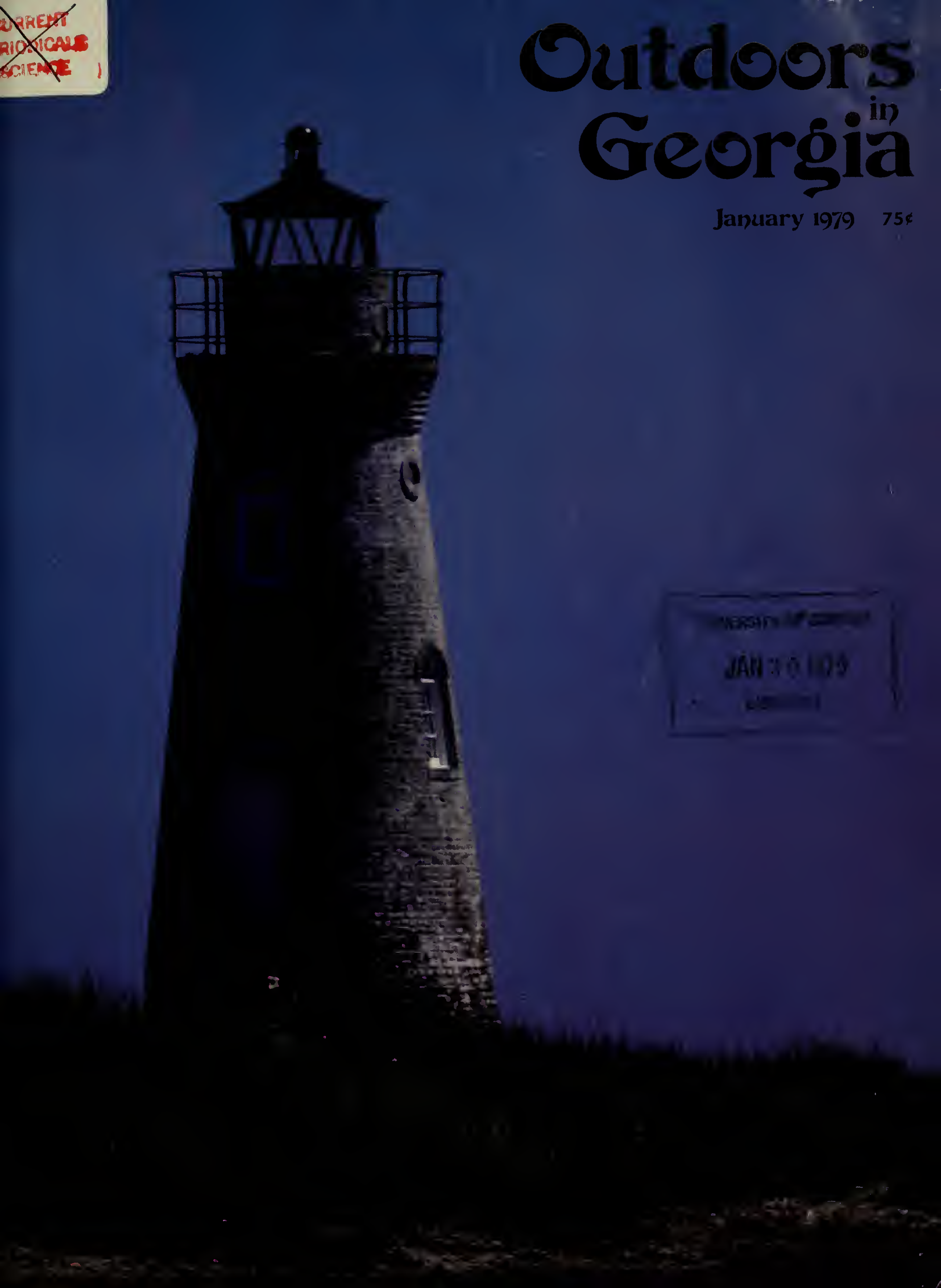
Outdoors in Georgia

January 1979 75¢



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Outdoors in Georgia

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Outdoor Commentary

Whither Earth Day?

What is the status of conservation as an important public issue in 1979? Is it still a viable concern with broad public support or is it already passing into the recesses of memory along with peace marches, 1950's nostalgia and other cultural artifacts of the 1970's?

The present decade was ushered in by Earth Day with a host of bright and beautiful attendants who professed the concept of wholeness of earth and the need to protect our ecological (*sic*) framework. Remember all those ". . . earth is a spaceship . . ." mottos on office walls?

Their vision caught on and great strides were made on behalf of many environmental concerns. Now, however, there is a reported withering of ardor as we face increasing costs of living, oil crises and reports of famine abroad and unreasonable grocery prices at home.

There has been considerable "I told you so-ing" from divergent quarters as former anti-eco-freak spokespeople lay much of the blame on environmental regulations which stymie industry. From the other camp we hear, "Aha!, the proflagrant waste of the Earth's resources has caught up with *you* and now *you're* going to pay."

In truth, double digit inflation affects us all with no respect to where we stood on Earth Day. Also in truth, much has changed since the debut of the Decade of the Environment nine years ago. Its proponents and opponents are of course older and presumably milder. The issues are now less clearly divided by "good guy/bad guy" images and are being perceived, quite correctly, as more complex than previously thought.

Facing facts squarely, we must also admit that the conservation cause is now past the point of dynamic growth and does evince a certain ennui. This has thinned the ranks of some of the more feverish types who draw their intensity from the limelight.

Now is the time for the hard work of refining yesterday's enthusiasms into the workable solutions for tomorrow. The energy crisis is real, and so are several other environmental problems. This suggests that although the days of conservation flag waving may be gone, we must continue to pursue solutions to problems which affect our daily lives.

Aaron J. Pais

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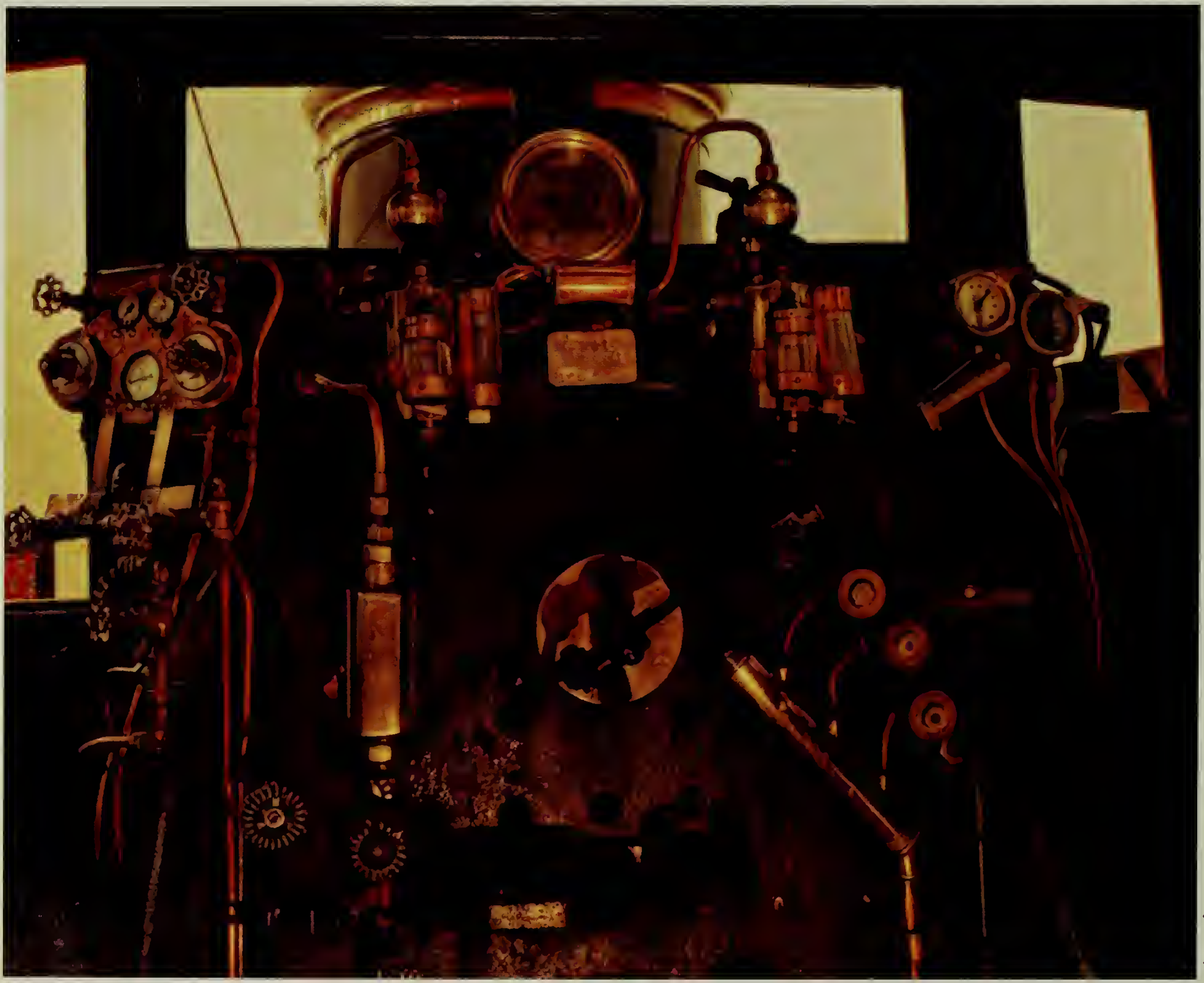
ANDREWS RAID

THE GREAT LOCOMOTIVE CHASE

BY BILLY TOWNSEND


Ed Brock

A look inside the General, *now at the Kennesaw Museum.*

Combine the movie plots of *Von Ryan's Express, The Great Escape, To Hell and Back, Judgment at Nuremburg* with a dash of *The Dirty Dozen* and you have most of the elements of the Andrew's Raid during the Civil War.

Over 1200 articles and books have been published concerning the Andrew's Raid. Two full-length movies have been made around the raid. One, *The General,* is a classic silent comedy which starred Buster Keaton. The latest, *The Great Locomotive Chase,* was a Disney production starring Fess Parker, which was filmed partly in North Georgia. A complete museum at Kennesaw is devoted to the raid and a locomotive-sized exhibit concerning the raid is located in Atlanta's Cyclorama. Of course, the balladeers and the comic book industry could not miss an opportunity like the raid either.

Why all the attention? Just the bare bones of the story give an indication of why the Andrew's Raid warranted and received this attention.

On the Virginia front, Union General George B. McClellan was waging his disastrous Peninsula Campaign. In early April, 1862 the war in the West was more violent. The Battle of Pittsburgh Landing (Shiloh to the Yankee reader) was taking place as our story begins.

The Union Commander in west Tennessee, Brigadier General O. M. Mitchell, was looking toward the next target. He planned to penetrate the Confederate line and seize lightly defended Chattanooga via Huntsville, Alabama. A daring spy, James J. Andrews, proposed an audacious plan that could have aided Mitchell.

Andrews is a somewhat mysterious figure about whom little is known. He stated that he was born in Hancock County, Virginia, but the Civil War found him living in Fleming County, Kentucky. Here, 30-year-old Andrews worked as a house painter and singing teacher. He was engaged to Miss Elizabeth Layton and they were planning to marry soon. Fleming County was predominantly pro-Union and Andrews joined the Union cause as a spy. Since Andrews was not adverse to turning a profit, his several spying trips to the Confederacy were coupled with trading ventures. The Southerners especially welcomed the quinine that he brought across the lines, and this gave him a certain latitude of movement in Dixie.

Andrews' plan was a bit more ambitious than running quinine through the lines and returning with military information, which had been his normal course. He intended to take a group of men 100 miles behind enemy lines, steal a train near Atlanta and burn railroad bridges behind him, all the way back to Tennessee. General Mitchell approved the plan because, if successful, it would slow reinforcements to Chattanooga while he was moving in from the west. Earlier Andrews had brought eight men into Atlanta to steal a train and burn bridges, but their engineer, a Unionist from Georgia, failed to show up. Andrews, greatly disappointed, and his volunteers, greatly relieved, made their way back to the Union lines. These eight volunteers were brave but not brave enough to try a second time.

Mitchell called for volunteers from three regiments of Ohio Volunteer Infantry (O.V.I.) for the highly dangerous secret mission. Eight men from the 33rd O.V.I., nine from the 21st O.V.I. and five from the 2nd O.V.I. plus a civilian replacement for a second regiment soldier volunteered. William Campbell, the civilian, had a shady background and was rather anxious to leave that particular area because of problems with the law.

The 23 men met with James J. Andrews in a dripping wet woods just off the Wartrace road near Shelbyville, Tennessee. The men, dressed in civilian clothing and armed with revolvers, divided into small groups. Their orders were to make their way to Marietta, 20 miles north of Atlanta, board a northbound train together and await instructions from Andrews.

Andrews issued the same "cover story" to all the volunteers. The men *on the way south* were to say that they were from Fleming County, Kentucky and were on the way to join the Confederate Army. If they were questioned closely they were to join the nearest regiment. Private James Smith and Corporal Samuel Llewellyn had to do just that near Jasper, Tennessee. They later made their way to the Union lines.

In addition to the same cover story, Andrews made another error that was to have disastrous consequences. On the way south Andrews decided that the constant rain would slow Mitchell so he delayed their planned theft from April 11 to April 12. John Reed Porter and Martin Hawkins arrived in Marietta on the 10th and were not seen by the other 20 raiders. Most of the nervous raiders tried to sleep at the Kennesaw House, three or four to a bed. Before daybreak on April 12, Andrews gathered the remaining raiders around him for final instructions. Porter and Hawkins had still not been seen so the others boarded the train without them.

The train was a mixed passenger and freight, pulled by one of the Western and Atlantic's (W. & A.) finest locomotives. The engineer was Jeff Cain, the fireman was Andrew J. Anderson and the conductor was William A. Fuller. Anthony Murphy, foreman of machine and motive power for the Atlanta Shops, was on the train headed for Allatoona to check a stationary steam engine. Seven miles north from Marietta the locomotive, *General,* made a twenty-minute breakfast stop at Big Shanty (presently Kennesaw).

When the passengers and crew piled out for breakfast at the Lacy Hotel, Andrews gave his orders to steal the train. There were three empty boxcars behind the engine and tender. Andrews ordered sixteen men into the cars, pulled the coupling pin behind them and walked to the *General.* Andrews, his two engineers, Private William J. Knight, Private Wilson W. Brown, and Private John A. Wilson clambered aboard the *General.* Sounds simple, but this took place within fifty feet of the guard line around Camp McDonald where several thousand Confederate recruits were training.

When the train pulled out, Fuller, Murphy and Cain rushed out of the Lacy Hotel and started out after it, much to the Camp McDonald guard's amusement. Before starting out, Murphy sent a messenger to Marietta to start a pursuit. Whether these men were reacting instincively to get their train back, chasing joyriding recruits or deserters they did not know at that time. They did what they perceived their duty to be. Surely they would recover their train two miles up the track where a crew was working at Moon Station.

That was not to be. The *General* had stopped to build up steam pressure that had gone down at Big Shanty. The sixteen closed up in that boxcar spent some anxious moments while the boiler was heated until the pressure built up to the 120 pounds needed by the *General.* Instead of being stopped at Moon Station the raiders borrowed some tools and loaded some ties to use for blocking track and burning bridges. Brown had gotten an iron bar with which he planned to pull up spikes. Then, and all day long, he regretted that it was not a crowbar especially designed for pulling spikes.

The *General's* real crew was only minutes behind when they jogged into Moon Station. The pursuers borrowed the work crew's hand car and started down the long grade to the Etowah River. Their suspicions were more aroused. A cut telegraph line indicated more than a lark or a deserter at work. The pursuers moved on, sometimes having to stop to remove ties laid across the tracks by the raiders, sometimes even having to lift the handcar over missing rails.

The raiders were well in front and moving northward, through Acworth, Allatoona and then across the Etowah River, where the piers of the W & A bridge can still be seen. The raiders felt free. They had no idea that pursuit had begun. There was no telegraph station at Big Shanty and the line was cut behind them. A branch line serving the Cooper Iron Works offered the next problem. The engine *Yonah* was standing just yards from the main line. Andrews decided it presented no problem so the raiders left it in peace.

Fuller, Murphy, Cain and two hands from the section gang were catching up while the raiders stopped to pull up track, cutting telegraph wire and taking on wood and water. At Acworth, Murphy and Fuller borrowed two old shotguns and picked up two more men to help push and pole the handcar. The *Yonah* was still sitting there when the pursuers reached the Etowah River. When Fuller explained the situation the *Yonah* pulled out after the *General* and the "Great Locomotive Chase" was truly on.

While the pursuers were struggling just to keep in the chase, one of Andrew's errors caught up with the raiders. General Mitchell had not delayed his move on Huntsville because of the rain. Mitchell had captured Huntsville and was moving toward Chattanooga. The Confederates were moving material out of the city and toward Atlanta. Instead of the one passing train at Kingston that the regular schedule called for, there were three. The raiders were delayed for one hour and five precious minutes. Four minutes after they pulled out, Fuller, Murphy and Cain arrived on the *Yonah.*

With the main line clogged with the trains that had just passed the raiders, the *Yonah* could go no further north. Murphy and Fuller started out on foot. The older Jeff Cain had to drop out. After a two mile trek the Confederate pursuers reached the Rome line where the *William R. Smith* was waiting. Loaded with volunteers the smaller engine took out after the *General.*

Although the raiders were anxious to get to Adairsville, ten miles further north, they felt that they must guard against pursuit. They stopped to cut the telegraph wire again, take up a rail and load wood to burn the bridges in the driving rain. While the raiders were lifting the rail, without the proper tools, they heard a most unwelcomed sound. From the south the whistle of what could only be a pursuing locomotive was heard. If the twenty armed men had known the strength of the pursuing train, they might have laid an ambush. They did not know, so no ambush was tried here or at any other point.

The *William R. Smith* was stopped by the missing rail and Fuller and Murphy were once again on foot. Two or three miles up the tracks the pursuers stopped the *Texas,* which had passed the *General* at Adairsville. The engineer of the *Texas,* Peter Bracken, fireman Henry Haney and wood-passer Alonzo Martin, quickly joined in the pursuit. Bracken backed the *Texas* to Adairsville, dropped twenty-one freight cars on the siding and took after the *General*—in reverse.

The raiders had left Adairsville with the fair possibility of running head on into the scheduled train. Andrews felt that the risk outweighed the possibility of getting caught. His carefully concocted story of running a wild train of three cars of powder to General Beauregard convinced the station agents once again to let him proceed.

The scheduled train had actually pulled out of Calhoun, but the crew heard the incessant whistle of the *General* and backed up to allow the *General* to pull into the siding. Andrews convinced the southbound train to pull out of his way. The track was clear ahead of them and a primary target, the Oostanaula Bridge, was just ahead. Surely the pursuing train heard at Kingston had been stopped. The wildly unprobable pursuit could not have been suspected or hardly even imagined.

The pursuers on the *Texas* pulled into the aroused town of Calhoun and quickly told their story. They also picked up some help. Young Ed Henderson, the Dalton telegrapher who had come south looking for the broken line, joined in the chase. Fleming Cox, an engineer from the Memphis & Charleston, volunteered to take over the fifteen-year-old fireman Henry Haney's duties. Several passengers also got into the tender of the *Texas* and the passenger train that the *General* and *Texas* had passed at Calhoun joined in the chase.

The engine and tender followed the *Texas* for the rest of the chase and on the tender were Captain W. J. Whitsitt of the 1st Georgia Confederate Volunteers with ten armed soldiers plus some recruits from north Georgia. Before it had been a score of revolvers against two rusty shotguns. Now the Confederates would have stood a chance if guns had come into play.

The raiders felt they were in the clear, but to make sure, they stopped to remove a rail about three miles north of Calhoun. They were busy at their work when they heard the whistle of the *Texas.* As William Pittenger put it, "A thousand thunderclaps couldn't have startled us more." The raiders scrambled aboard before the rail was lifted, and the chase entered a new phase. The raiders uncoupled a box car, but it slowed the experienced engineers only momentarily as they slowed to couple it to the *Texas* and kept on coming. The rain-soaked Oostanaula Bridge was just ahead but with the *Texas* so close, there was no opportunity to fire it. Another boxcar was dropped in a vain attempt to slow the *Texas.*

All pretense of a powder train for Beauregard was dropped. The ends of the box cars were broken out so that the raiders could move about freely and so they could drop ties on the track to slow or derail the *Texas.* That the *Texas* avoided the obstacles is remarkable in itself. Fuller was riding on top of the tender and would signal a stop. Four men were turning the brake wheel with a lever while Murphy and Bracken were pulling the reverse lever. Once the ties were removed, it was full speed ahead until the next obstruction.

The raiders had gained enough time with their tactics to make a fuel and water stop near Tilton, but the *Texas* came in sight when they were only half full. The *General* had to move on. They needed a lead at Dalton to make sure they could get through the town. The *General* was slowed to make sure the switches were open because by now the raiders were ahead of the regular schedule, but Dalton was safely passed. Soon afterward the raiders stopped to cut the telegraph wire. It was too late.

Ed Henderson had been let off the *Texas* at Dalton and all but the last few words of an alarm message got through to Chattanooga. The track was taken up and a cannon emplaced and a guard was mounted in the raiders' path. Behind the raiders there was the *Texas* with seven men, the passenger train from Calhoun with Captain Whitsitt and, further behind, a troop-laden train that had been brought up from Marietta.

The raiders now were in desperate shape and were coming to realize it. They failed to try an ambush at the W & A tunnel near Tunnel Hill and failed to try to fire any bridges. The rain had dampened the hopes of burning bridges, and the close pursuit had dampened the spirit of the raiders. A fire was laid in the last remaining box car in hopes of leaving it burning on one of the bridges across Chickamauga Creek. The *General* sped through Ringgold but the wood was running out. Andrews fully realized their plight and had been dropping raiders off since Tunnel Hill. Past Ringgold, Andrews burned everything available but still the *General* was faltering for lack of steam. Two miles out the *General* was stopped and the remaining raiders took to the woods.

For 87 miles the *General* had done everything called for. Sometimes reaching speeds of over 60 m.p.h. over a poor track, the *General* had been bested by an equal locomotive with a better supply of fuel. When the Confederates pulled up to check their barely damaged engine, the Great Locomotive Chase was over but the story of the Andrews Raid was not. Those hours between 5:45 a.m. and 1:00 p.m. were just the beginning of the ordeal.

HANGED

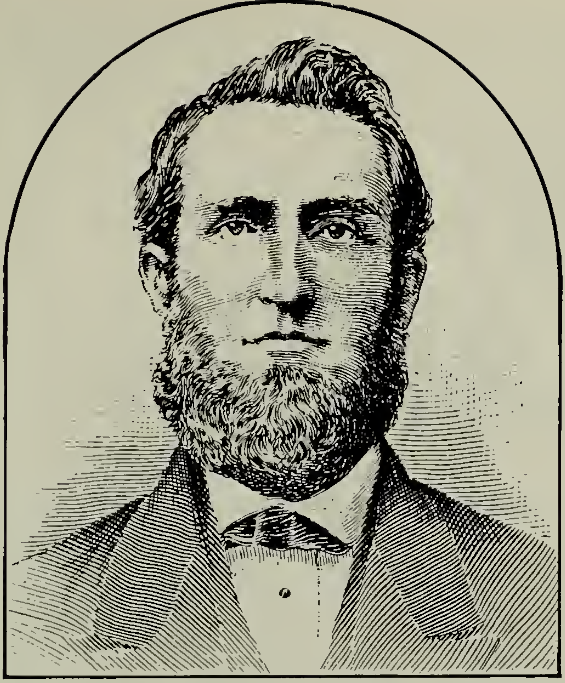
By April 24, 1862, 22 of the raiders had been captured. The cover story of coming from Fleming County,

The William R. Smith *takes up the chase.*

The Texas, *in reverse, crosses the Oostanaula River.*

The end of the chase at Graysville.

Paintings by Wilbur G. Kurtz
Courtesy, Wilbur G. Kurtz, Jr.



James J. Andrews

Kentucky had become the downfall of the men, captured in ones and twos by the military and the aroused populace looking for the "engine thieves and bridge burners." Soon all were gathered at the Swim's Jail in Chattanooga. On May 31, James J. Andrews was tried in Chattanooga while twelve other raiders were tried in Knoxville. When the shells started falling in Chattanooga, the Confederate authorities moved Andrews and his remaining men to Atlanta on June 7th. Within an hour of his arrival Andrews was taken to the spot that is now near the intersection of Juniper and Third streets where he was hanged and buried. The tall, dignified Andrews went to his fate bravely. His end was not so dignified, though. The cheap cotton rope stretched and Andrews' feet touched the ground. Instead of dying with a clearly broken neck, Andrews strangled after the dirt was dug from under his feet. The papers carried the story across the battle lines, and Elizabeth Layton cancelled her wedding plans and was dead in two years from her intense bereavement.

On June 18, the seven raiders whose court-martial had been completed were taken from the Fulton County jail to what is now the southeast corner of Memorial Drive and South Park Avenue. Here the seven were hanged and buried. Strangely, the raiders were not executed for stealing trains or trying to burn bridges but for "lurking in and around Confederate camps as spies, for the purpose of obtaining information." This charge was probably true of Andrews but not about the others. These raiders were later reinterred in the Chattanooga National Cemetery near a small bronze model of the *General.*

ESCAPE

In the week between Andrews' sentencing and his execution date, all efforts at Chattanooga were bent toward escape. A mass attempt was made—by cutting through the ceiling with a pocket knife—but only Andrews and John Wollam made it out before the guards were alerted. Andrews was free from June 1 to June 4 and Wollam until late June. Wollam traveled mostly by foot along the Tennessee River and was back inside the Union territory when he was captured by a Rebel raiding party. Andrews had held his boots in his teeth as he climbed from the roof of the jail. He lost them and for the next three days he swam, crawled and sometimes ran from dogs. He lost his shirt, too, and when Andrews returned to jail, his men hardly recognized the gaunt, bruised, sunburned man with the battered, briar-scratched and stone-cut feet. The recaptured Wollam was taken to Atlanta to join his thirteen comrades. In October there was more talk of executing the engine thieves. The fever to escape became hotter and hotter. The fourteen rushed the guards at the evening meal on October 16 in a well-planned mass attempt. Eight of the fourteen eventually made it to freedom. Alf Wilson and Mark Wood made their way along the Chattahoochee and all the way to the Gulf of Mexico, where they met the blockading Federal gunboat *Somerset.* The other six went northward until they made it through the Union lines.

The remaining six raiders stayed in the Fulton County Jail until March 1863. They were exchanged for Confederate prisoners at City Point, Virginia to finally end the saga of the Andrews Raiders.

CONGRESSIONAL MEDAL OF HONOR

The newly exchanged prisoners were brought to Washington where they were awarded the Medal of Honor. Jacob Parrott, the youngest raider, who had been beaten with a rawhide strap by his captors, was awarded the very first of these medals, which are authorized by Congress. Eventually, 19 of the raiders received the Medal of Honor. Campbell and Andrews were ineligible because they were civilians. George D. Wilson, Samuel Lewellyn and Charles P. Shadrack never received the medal, probably because no one ever applied for them.

THE METAL VETERANS

The engines that played minor roles are gone. The *Yonah* was scrapped in Atlanta. The *William R. Smith* was leased to the Muscogee Railroad and burned in the Columbus shops by Wilson's raiders in April 1865.

Two of the most significant veterans of the Great Locomotive Chase still exist. The race-winning *Texas,* extensively changed because of her conversion to coal, is exhibited by the City of Atlanta at the Cyclorama Building at Grant Park.

The *General,* which was severely damaged in the Atlanta Campaign, also is on exhibit. She rests at Kennesaw, only yards from where she was stolen on April 12, 1862. However, the *General* on exhibit is not the *General* of old. The cab is new, the boiler is new and of different configuration. Air brakes were added to make a 1960s tour possible and oil tanks are covered by a fake wood pile, but she is still the *General.*

O.I.G INTERVIEW: LEON KIRKLAND

By Lucy Justus

"What people see on the surface may be the opposite of what the situation actually is," said Leon Kirkland, director of the Game and Fish Division of the Department of Natural Resources.

"This year, for instance, there is a considerable movement afoot to increase the bag limit for deer," he continued. "We are harvesting a lot of deer and people think there's plenty. But what we are headed for is killing less than two deer, or not more than two.

"We are losing about 300,000 acres of wildlife habitat a year to changing land uses. We had a period when farming activities in Georgia decreased. A lot of land was planted back to timber and a lot was allowed to grow up naturally. Consequently, we ended up a few years ago with a maximum amount of the state forested and a peak deer population.

"But that trend is now going in the other direction. Land is being cleared up. We are seeing an accelerated rate of clear-cutting and pine monoculture. A small amount of this, of course, is fine because it provides wildlife openings and it produces food for a few years. But it's a different matter when you cut thousands of acres of mixed pine and hardwood, and plant that land back to pine. Once the cover is complete, it shades out everything and there is no production of wildlife food of any significance for a long period of time. Then there is urban sprawl—all that development is using up wildlife habitat.

"In order to maintain the deer herd at its present level, we would have to increase our management efforts beyond what they are at present.

"At the same time, the people who hunt deer have increased by leaps and bounds and are still increasing rapidly. In the past five years, there have been almost 100,000 new deer hunters.

"Right now, we have a hunter success in Georgia of approximately 20 percent. That means 8 out of 10 hunters don't kill a deer. Of the 20 percent who are successful, approximately 13 percent kill one deer, and only 7 percent kill two deer. This means that the 7 percent killing two deer are harvesting 64 percent of those taken. And the biologists tell me that 75 percent of the bucks killed in central Georgia are not over a year and a half old because of the intense pressure that's already on

"It is our job to tell the people what the facts are—to educate them to what we need to do—but there is always a lag in public opinion and response.

I've seen a lot of mallards, black ducks, pintails...coming into beaver ponds to feed. As far as ducks are concerned, the beaver has done more for ducks than we could ever have done.

The difference between killing a deer and a steer is that you raise a steer to be tame and feed him and get him to trust you. Then one day you knock him in the head."

the herd. That pressure is going to increase.

"With a population of deer that has peaked out and a population of hunters that is increasing, then we talk about raising the bag limit? We are talking about increasing the limit when 7 percent of the hunters are harvesting 64 percent of the deer. These facts would warrant reduction of the bag limit in order to distribute better the kill among hunters.

"It is our job to tell the people what the facts are—to educate them to what we need to do—but there is always a lag in public opinion and response. We may be able to convince them to do what is best and we may not. That has happened in conservation in too many instances. We are not able to regulate until long after the time we should have been regulating."

Leon Kirkland considers public education one of the most important aspects of his job.

He became director of the Game and Fish Division in June 1978, succeeding Jack Crockford, one of the nation's most respected Game and Fish directors.

Crockford had held the position since the reorganization of state government in 1972 and his expertise and integrity were instrumental in developing a division Leon Kirkland is proud of. He is also thankful he doesn't have to contend with the problems his predecessors had.

In 1958, Leon Kirkland joined the staff of the old Game and Fish Commission as a fisheries biologist. At that time, the Commission was operating on an annual budget of about $1 million; politics sometimes interferred with business, and professional employees were few and far between.

In addition, the 1950s and 1960s were characterized by legalized environmental blindness. The destruction and abuse of natural resources had reached an appalling peak. Streams were miserably polluted; wetlands were drained and free-flowing streams dammed at an incredible rate; roads were designed and built with little regard for the environment, and great schemes were afoot to mine or develop marshlands and other coastal resources. Game and Fish was embroiled in a constant fight to protect fish and wildlife habitat.

"When I came here there were only about half a dozen professional fisheries biologists in the state," Kirkland recalled. "Now we have between 25 and 30. The same was true of game management. Jack Crockford was our first wildlife biologist. He came in 1947. The first fisheries biologist came in the early 1950s.

"In those days, we didn't have enough law enforcement officers and training for them was non-existent. When a new guy came on, he just worked with an old guy in the adjoining county for a spell. That was the extent of his training. We have had a substantial increase in the number of law enforcement officers and we now have a full-scale training program for them. We have a very professional division with a budget of about $11 million."

Although the division does not have as many people or as much money as the director would like, he thinks it has enough of both to provide a good fish and wildlife program. And he plans no major changes because he thinks none are necessary. "I think the division is on target," he said. "Of course, problems and conditions change from year to year and we will adapt to those changes, but I don't foresee any others."

One thing he plans is to work very hard at promoting understanding between his division and the public. "The problem is to keep people adequately informed so they agree to what we need to do biologically," he said. "All the laws and regulations have to be approved ultimately by the people, so it is a matter of keeping us and the people in tune, you might say. Regardless of how capable we are and how much we know about the resource, we can't manage it properly unless people understand the facts and are willing to go along with what is best for the resource biologically."

Sometimes—through the lack of adequate and accurate information—people think the division is too conservative in its regulation of wildlife. At other times, for the same reason, they think it is not conservative enough.

After the coastal shad population had been declining for some time, many people, including commercial fishermen, thought the shad season should be closed. Game and Fish didn't think so and the shad season remained open.

Since shad streams are in much better condition than in the past, the decline could not be attributed to pollution. Neither could it be attributed to fishing pressure because tighter regulations had reduced the pressure.

"In nature, things don't start steady," Leon Kirkland said. "They go in cycles. In looking at figures, the previous history, we could see that these fish did cycle. They did so independent of fishing pressure.

"Based on our knowledge of the resource, harvest information and the number of users, we felt the situation didn't warrant closing the season. We think the decrease in the shad population is part of a natural cycle and we think we are now at the bottom of the cycle. This year we have started to climb. Hopefully we were right and that recovery will continue."

Two other species of Georgia wildlife have made striking recoveries in the last few years. One is the alligator; the other, the bear. Both were considered rare.

"They have increased to a point that we think in the very near future, there's going to be enough to allow people to take some of them," Leon Kirkland observed. "We now have somewhere around 80,000 to 100,000 alligators. We are starting to get a lot of problems with them. In many instances, we have to go in and trap and move them. We think in the next couple or three years we will be able to have a limited taking of alligators and selling the hides. But on a limited basis, where we can control it.

"Bears are the same way. We estimate we have 1500 bears or more in the state, and enough so we are beginning to have problems with them coming into town. We have to capture them and take them back. Those two species are doing real well."

Ed Brock

When Georgia opens its bear season, Leon Kirkland may be among the hunters. He does not consider hunting a mean or brutal sport and he thinks television has given people a misleading impression of hunting and nature in general. Many programs, he says, endow animals with human characteristics, depicting them as totally gentle, passive creatures, while ignoring the predator-prey relationship and the harshness of life in the wild.

"There are a couple of good wildlife programs aired on TV now," he said. "You see things happening just as they happen in nature: a snake strangles something to death and swallows it or a pack of animals chases another animal and pulls it down. It's cruel, you know, but that's the way it is. Nature is cruel.

"It has been demonstrated that you could have a year-around hunting season on squirrels, shoot them any way you want to and not have any impact on the squirrel population.

"What happens is that if you leave the old squirrels there and they have young and times get tough, the little ones are going to starve to death. They are going to stay right there and starve to death. Sometimes they won't be born, but in a lot of cases, they will starve or get diseased and die of disease. That's a pretty awful death. The victim may drag around for weeks or sometimes months and finally succumb to the disease or pneumonia.

"In other words, you are not going to have more animals by not hunting them. It is a matter of how you prefer the animal to die. Do you want it killed instantly with a gun or do you want it to drag around and die on its own?"

Although he has tried, Leon Kirkland does not understand people who object to killing wild animals but not domestic ones. "The difference between killing a deer and a steer," he said, "is that you raise a steer to be tame and feed him and get him to trust you. Then one day you knock him in the head. But the deer stays out in the wild and he can look after himself pretty well. You have not got his confidence in order to kill him. You go out there and compete with him in order to kill him. To me, there is a lot of difference."

Television may also have contributed to the increased interest in keeping wild animals as pets. "You find more and more people who want to keep skunks and lions and other wild animals," Kirkland said. "We could keep a man busy 365 days a year just patrolling the pet trade in Atlanta and the wild animal business. We need a man full-time to do nothing else in Atlanta. Other metro areas have the same problem. It's just not as big in other places because there are not as many people as there are in Atlanta."

Under current Georgia law it is illegal for a private citizen to keep any form of wildlife (animals which are not native to the state) as a pet except by permit. Under certain conditions, however, a citizen can keep wild animals (creatures which are not native to the state). Institutions, of course, can keep both for educational and scientific purposes.

"We can issue permits that say wild animals and wildlife can be kept for educational and scientific purposes," Kirkland said. "We think that is the only legitimate way a person ought to be able to keep wild animals. We don't want to do away with circuses and zoos and that sort of thing. There should be enough animals around so kids can learn about them and enjoy them and we have very strict laws about how such animals have to be kept and looked after. But we hope to tighten up the law so a private citizen can't keep most forms of wildlife or wild animals."

Leon Kirkland is of the opinion that at least one wild critter has been badly maligned. Beavers are generally unpopular because they chew down trees and their dams frequently result in flooding which damages crops, pastures and forests. The Game and Fish Division assists landowners who are having such problems.

"But in a lot of cases, beavers build these ponds in areas where the timber is not harvestable at all or is of marginal quality. In those cases, beaver ponds are of tremendous benefit," Kirkland said. "They do a lot of things.

"During dry weather, they are sources of water for various types of wildlife and the timber growing around the edges gets some benefit. When you have heavy rains, the water hits the beaver ponds, the silt settles out and you keep the soil where it should be, or closer to where it should be. That allows you to have cleaner water in the stream.

"But the best thing is that those ponds are extremely productive of both fish and wildlife. Some of the best bass fishing and bream fishing I've ever had has been in beaver ponds.

"The wood duck has been on the increase in Georgia and there is no doubt in my mind that one of the biggest reasons is that we've got a distribution of beaver ponds over the state that's good habitat for the little ducks. They have to have some place when they hatch out and those ponds are extremely productive of aquatic vegetation and animal life that serve as food. I've seen a lot of mallards, black ducks, pintails—the whole bit—coming into beaver ponds to feed. As far as ducks are concerned, the beaver has done more for ducks than we could ever have done."

Leon Kirkland has a lot of successes to his credit. He was responsible for Georgia's first successful rearing of striped bass, for inaugurating the walleye program in the state, establishing two-story trout fisheries in several lakes, for stocking white bass in most of the state's reservoirs and for beginning the smallmouth bass stocking program. He was also responsible for the introduction of threadfin shad, a forage fish which provides food for most game fish, in reservoirs.

Strangely, one of his biggest successes is a trout stream which has frustrated some of the best fishermen in the nation. Waters Creek in north Georgia is a trophy trout stream where anglers can see dozens of huge trout gliding about within a few inches of their hooks. But the fish, which are fed regularly, are not unduly eager to be caught. And no rainbow or brown trout measuring less than 22 inches can be kept, nor brook trout less than 18 inches.

"Some of the Trout Unlimited boys had been up to North Carolina where there is a stream similar to this," Kirkland recalled. "They came back wanting to know if we could set up a stream just for trophy trout fishing down here.

"The biggest problem was in finding a stream which had limited access and a place where somebody could live close and really look after it. If you tried this in a normal stream without added protection you wouldn't have any fish left in a week's time.

"We stocked Waters Creek the first year with big brood fish and fed them through the winter and opened the stream the next spring. The Trout Unlimited people are due a lot of credit for their cooperation and support. They have worked with us a lot and some years have actually manned the checking stations for us.

"We get 1,000 to 1,500 trips per season and I think it pretty well satisfies the demand as far as we can tell right now. If it ever got to the point where it didn't we would consider another stream somewhere else."

Because of Waters Creek, in 1972 Kirkland won TU's Silver Trout Award for outstanding work with mountain trout.

In retiring, Jack Crockford said of Kirkland, "He is a very well qualified fisheries biologist, and he has picked up a broad interest and understanding of the division. He has an amazing grasp of the overall work of the department. He is a good planner and does well under strain. Leon is remarkable in that respect. He is going to make some improvements in the division."

Learning to Cope

Fishing in a cool north Georgia trout stream. Lying on a sunny beach. Hiking our rolling woodlands. This is the therapy most of us know. But Georgia's outdoors is providing a different kind of therapeutic experience for some of our young people. Here is the story of one outdoor program which is meeting some very special needs.

By Mary Eleanor Wickersham
Photos by Kevin Schochat

Rain was continuous for the first four days. Then the temperature dropped. An unpleasant 40 degrees became a miserable zero. With a blanket of ice and snow and wind gusts up to 40 miles per hour, the mountains around Unicoi became treacherous overnight.

Hardly camping weather in anyone's manual, nine youngsters and three adults braved these miserable conditions for eleven long days. With the weather making even the most simple tasks difficult, if not impossible, the 11 to 15 year olds set up camp, gathered wood, dug latrines, cooked their meals and somehow managed to survive.

This was an endurance contest for any age group, but the children who struggled through this experience did something more than exist. Youngsters with behavioral and emotional problems, they learned through this experience something about themselves and getting along with others. Participating in the Georgia Outdoor Therapeutic Program, they were learning the basic socialization skills they so desperately needed to better cope with their environments back home.

Primitive camping as a means of therapy did not originate in Georgia, but the program, jointly sponsored by the Departments of Human and Natural Resources, is a rarity on two counts. Not only is a state-operated outdoor therapy program unusual, the cooperation exhibited by these two state agencies is practically nonexistent in other places.

Barbara Harvey, acting director for Child and Adolescent Mental Health Services for DHR and chairperson of the task force which planned the program, talked about its origins. "Chris Delaporte, then with DNR, and Bob Pulliam of our department had talked about organizing a wilderness program for troubled children. I got pulled in with several others from both departments and we took the ideas to Governor Carter."

Upon learning its service goals and determining there was no existent program providing these services, Carter gave the group the go-ahead to seek federal funds to develop a demonstration program. His approval was a step in the right direction, but no money had been allocated for the project. "I'll have to hand it to Barbara Harvey and the others on the original task force," says Bill Marx, then superintendent of Unicoi State Park. "They scratched and hustled and found money to get it started and to keep it going."

DHR received grants from the Office of Economic Opportunity and the Law Enforcement Assistance Association, and DNR agreed to provide land and support services for the camp to be located near Unicoi. But its opening was still not guaranteed. Even after

detailed site studies of the area were completed, there was no money to print the report. The task force happily located Housing and Urban Development funds and by the fall of '74, Georgia's first outdoor therapeutic program was a long-awaited reality.

Then came 1975. Outdoor therapy backers had to search for money again, but the program had been well received enough to earn DHR funding, a federal Title XX grant and continued DNR support.

Now in its fourth year of operation, the program is well established and growing. The reason is simple. Outdoor therapy works. Washington County School System teacher Bobby Nash, a two year veteran of the camping trips, explains why it helps. "Primitive camping strips a kid of outside bombardment. It takes him back to a simple existence. Through the responsibilities he must accept and with the absence of extraneous stimulation, a youngster can begin rebuilding his behavioral patterns himself. He learns to cope."

Children from eight to eighteen in an established group from the mental health system, the juvenile court system, public schools and the Department of Family and Children's Services who have experienced difficulty in getting along with their parents, teachers and peers are eligible for the center's short term program. A residential program for children with more severe problems also operates and is currently expanding.

Not only is the outdoor therapy program an additional and different type of mental health facility for Georgia, it in many cases saves the taxpayers' money. "A number of the children in our residential program would have had to be hospitalized at an approximate cost of $100 a day," explained Barbara Harvey. "In both long and short term programs, the cost per child is about $20 per day." With the center working with 30 to 40 children each month in the short term program and the number of residential participants growing, considerable savings may be realized over a period of time.

Outdoor therapy has other advantages for the child. When he leaves the program, he can feel good about himself. He has learned new skills: camping, hiking, canoeing, swimming and cooking. He knows he can survive in the outdoors. As staff counselor Teri Reddick reminded a group of Washington County youngsters who braved the January weather, "You're tough and you know it!" Armed with new skills, they no longer have to fight to prove their prowess. "The real confrontation," the counselor explains, "is between the child and his ability to meet and solve his problems. Each child must confront himself and grow at his own pace."

For further information on the Outdoor Therapeutic Program, contact Ross Cooper, P. O. Box 256, Helen, Georgia 30545, phone: 404/878-2899.

Program director Ross Cooper talked about how the program works. "Therapeutic camping provides opportunities to deal with problems in a reality-oriented setting 24 hours a day. The group process is the primary treatment tool. When a problem occurs, the group stops and does not continue until a satisfactory solution has been agreed upon."

Satisfactory solutions aren't always easy to come by and during the first days of a trip, the problems come fast and furious. Meals are not ready on time, dishes not clean, assigned chores not completed, fighting, stealing, not listening to instructions—these are real problems which must be faced when a group of people has to work together to exist. Group sessions can be called any time day or night, but they cannot end until a solution is reached by the group.

"Counselors try to avoid being conventional authority figures," explained co-counselor Kevin Schochat. "There were times, of course, when we had to assume authority, but the idea is to let the children handle their own problems."

Once camp is established and routine chores are understood, the youngsters go through an interaction course. In one exercise, the whole group must figure out how to cross over a 12-foot wall. Later they attempt having the entire group stand on a free-swinging log. As the hours pass, group members begin to see that cooperation is essential if they want to get anything accomplished.

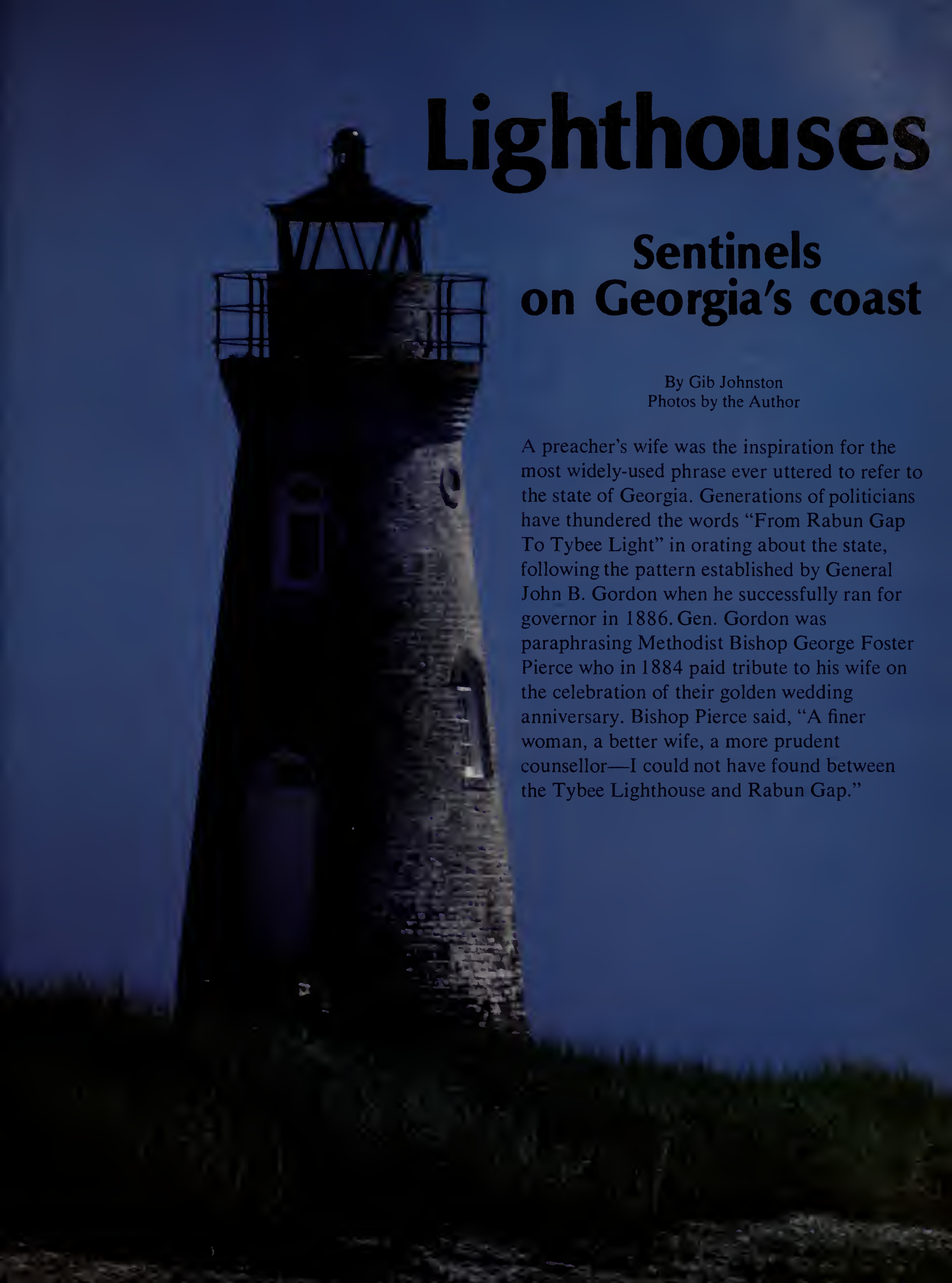
"The first days weren't easy," recalls Nash, "and the weather didn't help matters. But by the seventh day only three groups were called. That was progress!"

Schochat tells about one youngster who initially refused to attend group sessions at all. Before the trip was over, he had cut through the snow and ice to make steps down a steep embankment so that retrieving water would be easier for everyone. But is such improvement widespread? And is it long lasting?

Nash and Schochat agreed that behavior was not significantly different when the students returned to school. "No one would expect a miracle cure, a 100% change in 11 days," Nash said, "but I can see marked changes in some of the children and mild improvement in all of them."

"They all learned camping skills, a great deal of insight into race relations and that there are ways of dealing with problems other than fighting," Schochat added.

At a post-camping group session, counselors and children munched gorp, a high energy food they had nibbled on the trail, and saw Schochat's slides made during the trip. They saw themselves cooking and hauling water and lugging firewood and practically freezing in January's frigid mountain air. They laughed and they talked and they reminisced. And they felt good about themselves.

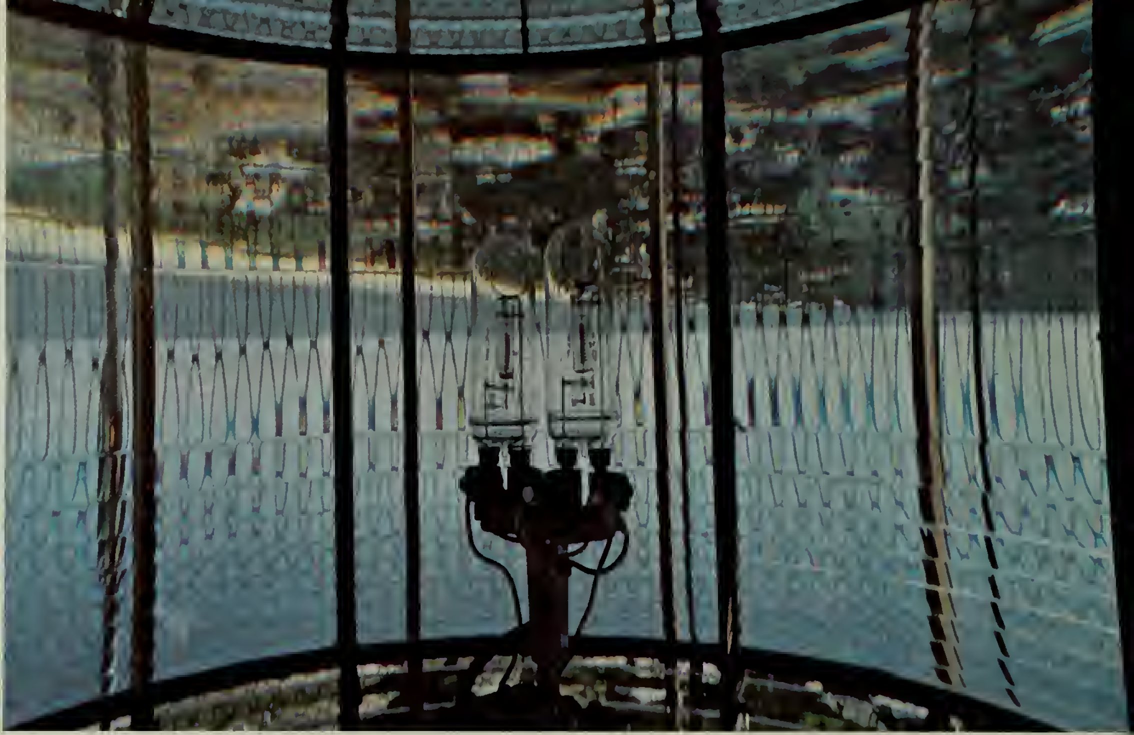


Lighthouses

Sentinels on Georgia's coast

By Gib Johnston
Photos by the Author

A preacher's wife was the inspiration for the most widely-used phrase ever uttered to refer to the state of Georgia. Generations of politicians have thundered the words "From Rabun Gap To Tybee Light" in orating about the state, following the pattern established by General John B. Gordon when he successfully ran for governor in 1886. Gen. Gordon was paraphrasing Methodist Bishop George Foster Pierce who in 1884 paid tribute to his wife on the celebration of their golden wedding anniversary. Bishop Pierce said, "A finer woman, a better wife, a more prudent counsellor—I could not have found between the Tybee Lighthouse and Rabun Gap."



The first order Fresnel lens inside Tybee lighthouse. The prismatic effect makes the world look upside-down.

Because the bishop coined that now-cliched phrase, Tybee Lighthouse has become one of Georgia's most identifiable landmarks.

It seems odd that a lighthouse would be so fondly and passionately referred to by so many generations of Georgia politicians, especially since these structures are more often thought of in conjunction with the rocky, cold and stormy coasts of more northern latitudes. Yet Tybee Light dates from the earliest moments of Georgia history. James Oglethorpe ordered a marker constructed on Tybee Island in 1734, making the light possibly the second oldest in the United States.

Historically Speaking

Lighthouses or light towers have occupied special places in history and have been held in awe by landlubbers and seafarers alike. Two of the most famous, The Pharos of Alexandria (c. 280 B.C.) and the Colossus of Rhodes (built between 292 and 280 B.C.), are among the Seven Wonders of the World. And some scholars suggest that the myth of Cyclops, the giant with the single eye, originated in the fear of primitive peoples of the lighthouses that dotted the shores of the Mediterranean Sea.

Well-known names are associated with lighthouses. One, Italy's Genoa Lighthouse (1161), had as its keeper in the 1400s a man from a family of weavers. He, no doubt, had some influence in molding the future of his nephew in navigation and seamanship. His name was Antonio Colombo; his nephew, Cristoforo, won his place in history as Christopher Columbus.

The first lighthouse in the New World was at Vera Cruz, Mexico in the late sixteenth century. North America's first was the Boston Light (1716); second was at Cape Breton, Nova Scotia (1733) and the third was Oglethorpe's pride, Tybee Light, first lighted around 1778 although it had stood as a daymark since 1736.

Those first lighthouses were very simple: a pile of stones with a fire built on top of them; a torch; a bonfire. Since the distance that the flame can be seen is directly proportional to its distance above the ground, towers were built to elevate the flame. Hence the structures we now know as lighthouses came into being.

Unfortunately, early lighthouses were less efficient when they were needed most, during fog and rain. In the 1700s, tallow candles and oil lamps were installed in many lighthouses where roofs had been built to protect the flame. The lights thus became more reliable in bad weather. The low intensity of the lights was also a problem and often mariners found it almost impossible to distinguish between the lighthouse and a dwelling on the shore. Unscrupulous "wrecker" gangs capitalized on this situation by setting up lights to lure ships onto rocks in order to plunder the cargo from the wrecked ships. Obviously more and better light was needed.

Lenses Intensify Light

The first attempt to intensify the light was made in France where a cone, covered with bright tin plates, was hung above a wood or coal fire. This worked, but the soot from the fire soon coated the metal plates and made the brighter light impossible to maintain. The first real advancement came in England where, during a "convival evening amongst the scientific gentlemen of London" one gentleman bet another that he could read the newspaper by the light of a candle 200 feet away. He won his bet by lining a wooden bowl with bits of mirror stuck in putty. A candle, properly placed in the center of the bowl, illuminated the paper sufficiently for reading.

Wick lamps were widely used but were not the final solution. Although brighter, the smoke hazed the glass, thus diminishing the light.

In 1871, Ami Argand developed a lamp with a hollow, circular wick that allowed oxygen to pass both inside and outside the wick. The flame was intense, equal to seven candles and smokeless.

Using this lamp and the parabolic reflector of the convival Englishman, American ship captain Winslow Lewis developed a better system that became the standard for American light. Lewis' parabola was of the "washbasin variety" and when combined with the greenish tinted lenses of the day, had the effect of diminishing the light and defeating the original purpose of it. However the United States Lighthouse Board was so enamored of the Lewis System that the U.S. lagged behind Europe in quality of navigation aids, since the far superior Fresnel lens was available in Europe.

As a comparison of the various systems, only 3.5% of the light from a candle reached a ship. The reflector increased the amount to 17%. The Fresnel lens allowed 83% to be seen.

In 1822, Augustin Fresnel, a French physicist, single-handedly revolutionized lighthouses with the invention of his lens. This innovation was not part of his job, however, and the French government forbade him to continue.

His lens resembles a giant, old-fashioned bee hive. A single lamp is surrounded, above and below, by prisms which reflect all the light through a lens in a narrow sheet. This lens is still in use throughout the world and is the preferred system although more modern optics and high intensity lamps are probably superior. It has served candles, oil lamps, oil vapor lamps, gas lights and in this century electric lamps. It is the epitome of beauty and utility.

Some of the early lighthouses were very elaborate structures and were as tall as 500 feet. Such outrageously tall structures are of time past now; the modern height is around 150 feet. Higher lights can be seen further at sea, but the horizontal light beam from taller lighthouses is not visible at close range.

Georgia's Lighthouses—Tybee

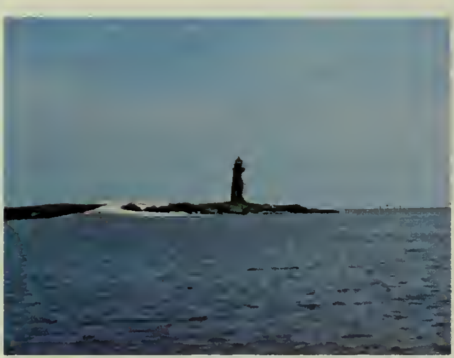
Of the dozen or so lighthouses that have stood in Georgia, only Tybee, South Channel (or Cockspur Island), Sapelo Island, St. Simons Island and Little Cumberland lighthouses still survive, and only two of these, Tybee and St. Simons, are still in service. The others have vanished, and there is little left to mark their passage.

The "Grande Dame" of Georgia lights is Tybee. The first structure on this site was ordered built by James Edward Oglethorpe in 1732 with a completion date set for 1734. Various complications, sickness, isolation and difficult living conditions prevented actual completion until 1736 and then only after Oglethorpe threatened William Blytheman, the builder, with jail. The structure was 90 feet tall with a 25-foot base and was octagonal in shape with a brick foundation. Severe winters in 1740 and 1741 did great damage to the tower, and Thomas Sumner was hired to repair the damage, but when it was found to be beyond repair, a second tower was built. This tower stood 94 feet tall with a 30 foot flagstaff and was fully weatherboarded, with a roof; it lasted until the early 1770s. The third tower was a 100-foot tall brick structure that was, at some unknown time in history, lighted with candles. In 1857, however, a second order Fresnel lens was installed there.

During the Civil War there was a Confederate unit stationed on Tyee Island. When they found it necessary to withdraw from the Island because of encroaching Union forces, the Confederates exploded a keg of powder in the tower in an attempt to destroy the lighthouse. The explosion destroyed the wooden staircase and caused considerable damage to the upper reaches of the tower. In 1867, after extensive renova-

Tybee lighthouse

The light at Cockspur Island, built in 1848-9, is now owned by the National Park Service.



tions, the light, now 150 feet above sea level and fitted with a first order Fresnel lens, was returned to service.

(First, second and third order refer to the size of the lens and, therefore, to the intensity of the light emitted. A first order lens like that now at Tybee is the largest and brightest available.)

Storms during the decade of the 1870s caused the brick tower to vibrate and crack, and the tower was condemned and a new one was recommended. This recommendation was repeated yearly for the next eight years, but no funds were appropriated. An earthquake in 1886 broke the lens and lengthened the cracks; repairs were then made. The 1867 renovation of the original 1773 tower is still in operation today with a first order Fresnel lens yielding candlepower that is visible 19 miles at sea. The light now serves as the rear range for Tybee Roads

Cockspur Island

There has been a lighthouse at Cockspur Island, a few miles up the Savannah River from Tybee Light, since 1772, but little is known about the earliest one. In 1848-49, the South Channel Light was built on an oyster bed just off the south tip of the island. Simultaneously, a sister light was built on Oyster Bed Island in the north channel. Why one survived the other is a matter of fate that seems a part of this light's destiny. This fate may or may not have been founded in the name of the first keeper, John H. *Lightburn.* The real test came during the War Between the States when Yankees unleashed their new-fangled rifled cannon upon the Confederate band garrisoned in Fort Pulaski. The positions of the northern guns put the lighthouse in direct line of fire. However the fort was breached so quickly that Yankee fire spared the lighthouse.

The light was returned to service in 1866 and continued until 1909 when it was discontinued due to the use of the north channel by the deep water ships. Service as a harbor beacon continued until 1949 when the tower was abandoned by the U.S. Coast Guard. The tower was transferred to the National Park Service in 1958, and last year, the 129-year-old structure underwent repair and restoration.

Sapelo

The Sapelo Island Lighthouse was built on five acres of land purchased from Thomas Spalding on the south end of that island at the mouth of Doboy Sound. Winslow Lewis, developer of the lamp system that bears his name, was hired to construct the tower. Captain Lewis installed a 15-inch reflector-type light at Sapelo light in 1820.

With two exceptions, the installation of a range beacon and the substitution of the reflectors with a new fourth order (probably Fresnel) lens, the first 35 years of this light's history were uneventful.

During the Civil War, the light station was "much injured by the rebels," as one source reported. Repairs were made in 1867 and the station was reactivated in 1868. At the same time, the new, skeleton frame beacon, "660 feet distance from the tower," was displayed.

In the middle 1870s, the beacon had begun to rot and plans were laid for a new iron beacon to replace it. This new beacon was installed in 1877 and today is a magnificent structure, adorned with Victorian gingerbread trim.

(Top photo) The beacon at Sapelo Island was built in 1877. (Below) Sapelo's lighthouse stands today, an abandoned sentinel on Georgia's coast.

Sometime around 1890, the lighthouse began a losing battle with the sea. Each annual report to the Lighthouse Board emphasized the encroachment. In 1902, the keeper's residence, which was then uninhabitable, was torn down and its bricks used to reinforce the ground at the base of the tower. This measure was effective for a while, but the tower finally lost its battle.

The present tower was built in 1904-5 and the lighting apparatus was installed and lighted on September 18, 1905.

The light was discontinued sometime prior to 1930, but the tower is still standing (as is the cast iron beacon) and in good condition. This lighthouse is now owned by the state of Georgia.

Little Cumberland

The need for a lighthouse at the entrance to St. Andrew's Sound between Cumberland and Jekyll Island was evident as early as 1802 when money was appropriated for the construction of the Little Cumberland Lighthouse. During the next 35 years, more than $55,000 was earmarked for this project and more than $30,000 was returned as surplus funds. Finally in 1838, the light was established, and according to records of the Lighthouse Board, it remained in continuous operation until the early part of this century.

There was some sort of activity involving the lighthouse during the Civil War, for in 1867, it was written that "extensive repairs have been made to restore it after its damage by the rebels." However, the damage was not so extensive that the light was taken out of service.

Around 1879, there were reports of encroachment by the sea on the land to the northwest of the tower, and in 1876, a large brick wall was built to a depth of two feet below the tower and the space between filled with concrete and paved over with brick to slow the damage.

In 1879, the "old style" tower (which had timbers built into the brickwork) showed decay and plans were made to repair the structure with iron.

The iron lantern deck that had rusted to the point that it was not secure was replaced with a temporary wooden deck and in 1901 the new iron deck was put into place.

History, it seems, has dealt kindly with this, the oldest standing lighthouse tower in Georgia, though with only few repairs listed in 82 years, it was taken out of service in 1919 in favor of automated buoys.

The structure was sold at auction in 1921 and is now the property of the Little Cumberland Island Association which in 1968 renovated and repaired it and for a short time relighted the lamp. This light was short-lived, however, due to the hazard it presented to navigation in the area.

St. Simons

The story of the building of St. Simons Lighthouse was the subject of a book, appropriately titled *Lighthouse,* written by Eugenia Price. In 1807 James Gould, a native of Granville, Massachusetts who has spent many years in the timber business in Georgia and north Florida, submitted a bid for building the newly

The St. Simons lighthouse, an 1872 structure, is still in service today.

proposed St. Simons Lighthouse. The light and keeper's house were to be built on four acres of land at the south end of the Island which had been sold to the government (for $1) by Gould's friend, St. Simons' planter John Couper. The light, completed in 1810 and formally lighted in 1811, was an octagonal tower, 75 feet high with a 10-foot iron lantern equipped with a set of oil lamps for illumination. James Gould served as lighthouse keeper for 27 years.

In 1857, St. Simons Lighthouse was fitted with a new third order lens, replacing the old, less effective oil lamps. At the same time, the station was recommended for a first-order lens since, just the year before, Congress had authorized the establishment of a naval base in nearby Brunswick. However war, which broke out a few years later, prevented the installation of such a lens.

In 1862 when Confederates were forced to abandon this island, too, they destroyed the station at St. Simons and blew up the tower. Bids for reconstruction of the light were opened in 1868 and work started soon thereafter.

This construction, however, was not to be completed until almost four years later. The major problem was not in the construction but in "stagnant ponds . . . a source of malarial poisoning." There was widespread illness among the builders, and work was halted when the "contractor and one of his bondsmen . . . died at the work." After that, most of the work on the project was done in the winter months and the light was, at last, illuminated on the night of September 1, 1872.

While the earthquake of 1887 did minor damage to the St. Simons Light, its other history is without incident.

This station is still in service today, operated by the U.S. Coast Guard with a first order lens and automated light. As a landmark and showplace, St. Simons Light, its attached keepers house and the rumored ghost whose footsteps can supposedly be heard on the stairs, is second to none.

Access to these Georgia lighthouses is as different as the structures themselves. Tybee Light is open to the public but large groups must take turns climbing the tower for only a limited number of people are allowed inside at one time. Since this is still operated by the U.S. Coast Guard, it is a good idea to contact them for permission.

The South Channel Light (or Cockspur Island Light) is part of Fort Pulaski National Monument and is open to the public. It's a long, hot walk up the tower; getting to the tower involves wading a small tidal creek. (This is more practical at low tide.) The tower is also accessible by small boat. Permission is not absolutely necessary, but visitors might check in with the superintendent of Fort Pulaski before visiting this lighthouse.

Sapelo and Little Cumberland lights are generally inaccessible to visitors. Sapelo, which is owned by the Department of Natural Resources, is located within the University of Georgia's Marine Research Center and there is no good way to see the tower. Little Cumberland Light is privately owned by the Little Cumberland Island Association, and permission from them to visit the lighthouse is mandatory.

St. Simons Lighthouse, operated by the Coast Guard, is not open to the public, but the keeper's house, next door, is open and houses a fine museum.

The two operational lighthouses, naturally, continue to serve as they have through the years, and though inactive, unlighted and abandoned, the other three join them in serving as familiar landmarks for boaters on the Georgia coast.

The Mansion at Milledgeville

By Mary Eleanor Wickersham
Photographs by Kevin Schochat

It was May 9. The rains had finally stopped, the sun making spring more than a promise. The rays burst through the window, lighting J. C. Bonner's book-lined study on Jackson Street in Milledgevile.

On another May 9, just two blocks away, but 103 years earlier, the spring sunshine went unnoticed. The Confederacy having fallen, Georgia Governor Joseph E. Brown waited in the Executive Mansion on Clarke Street. That evening a squad of Union cavalrymen dismounted and marched up the front steps, passed between the huge columns, and entered the front door of the Mansion. The Governor answered their call, coming to the rail in the rotunda to learn of his arrest.

Brown's arrest and the subsequent move of the capital to Atlanta marked the end of an era. The war was over. Milledgevile, no longer the seat of government and without bridges, telegraph lines or railroads, all of which had been destroyed by Sherman's army, was more isolated than ever.

James C. Bonner, Milledgeville's esteemed, white-haired gentleman historian, has told the story of his adopted town in a recently published book, *Milledgeville, Georgia's Antebellum Capital* (University of Georgia Press, $14.50). Throughout that book are references to the Executive Mansion and its role in the town's history. And happily for lovers of history, that old Governor's Mansion still stands, its stout pink stuccoed walls a monument to another time.

Georgia's first governors' residences were, however, more humble. The 1807 residence was nothing more than a double log cabin on South Jefferson Street. In October of that year, Mrs. Jared Irwin prepared to move to this simple house which overlooked Fishing Creek in the new capital town of Millegdeville. Proud of her position as governer's wife, she was determined to enter Milledgeville in some vehicle more elegant than an

The Governor's Mansion at Milledgeville is now home to the president of Georgia College.

oxcart. Having stopped at the inn between Sandersville and Milledgeville for refreshment, she remained outdoors in the handsome gig the Governor had bought for her. Suddenly, a big rooster flew out, frightening the horse which threw Mrs. Irwin from her carriage. She suffered a broken leg and, as fate would have it, she later entered Milledgeville stretched out on a mattress in an oxcart.

In 1809 a two story clapboard house on South Wayne was purchased by the state for $4,599. The state of the third governor's house, built in 1820 on Green Street, was the reason money was appropriated for the more elegant governor's residence that stands today. Dr. Bonner says, "The few extant descriptions of this structure and its furnishings suggest that it was a house of little elegance; in fact one governor refused to live there."

The simplicity of these pre-Mansion houses is not surprising. Bonner says that it was 1830 before Milledgeville began to emerge from its "frontier ethos." In fact, "not until after 1835 did forks come into general use in the dining rooms of Milledgeville's elite."

As the capital town grew more sophisticated and the condition of the 1820 residence more dilapidated, the legislature made its move. In January of 1836, they offered a $100 prize for plans for a governors' residence. Oddly enough, two men were awarded the prize at separate times. On March 10 John Pell received the award, and a month later, C. B. Cluskey won the prize by legislative action. Input also came from New York architect H. A. Norris and from Connecticut builder, Timothy Porter. The dominating influence of Palladio's Villa is readily spotted as the mansion is still recognized as one of the more perfect examples of Greek Revival architecture in the South.

By the fall of 1838, the house was ready for its first family. The projected cost of $15,000 had been long surpassed, the actual total amounting to $50,000. In fact, the construction of outbuildings was delayed because the budget had been exceeded.

In its early days, the Mansion was only sparsely furnished, a condition which Dr. Bonner suggests might have restricted the use of the Mansion for social events, particularly during George Gilmer's term which included two years in the new residence. Conditions did improve as succeeding governors added their own furniture and the state appropriated more money for furnishings. The Mansion's second residents, Governor and Mrs. Charles J. McDonald, were given an allotment by the legislature during their term of office. Mrs. McDonald purchased a beautiful Axminster carpet with some of the money, only to have it badly damaged by hundreds of muddy shoes trampling over it the first night it was used.

As with any house, the ambiance of the Mansion depended on its residents. Mrs. McDonald apparently enjoyed simplicity. When the Governor's daughter was married, the invitations were delivered by hand by one of the servants. An 1843 letter details how the young man asked the invited guest to pick out her invitation from the handful he grasped. It read "Governor and Mrs. McDonald ask the pleasure of your company on Thursday evening at half past 7 o'clock. None but young company are invited except a few neighbors." The writer of the letter said she thought the invitation showed "very little form for the head of State."

It was also during McDonald's term of office that local notable Billy Springer seated all of his 500 pounds on Mrs. McDonald's spindle legged sofa and broke every leg off.

George W. Crawford, Georgia's chief from 1843 to 1847, was the third governor to live in the Mansion. Dr. Bonner says, "Mrs. Crawford was a person easily accepted as a neighbor by residents of the town in all walks of life. For example, when the first lady stopped in a tavern to call upon the wife of world famous geologist Charles Lyell, the landlady easily made herself one of the party and entered into the conversation as if both distinguished ladies were her guests."

If the Crawfords were known for their congeniality, the Mansion's fourth residents, Governor and Mrs. George W. Towns, were recognized as being refined and charming. It was, however, the Howell Cobbs, who lived in the Mansion from 1851 to 1853, who were known for their lavish hospitality.

During the Cobb's tenure, the great dining hall which runs across the lower level of the Mansion, was often filled with guests who enjoyed the bounteous meals served from long tables. Yet, despite the gaiety, Mrs. Cobb was a tragic figure. Three of her seven children died during her husband's term in office.

In 1853, Herschel Johnson took office. Although the Governor had a reputation for being stern and unsociable, Mrs. Johnson was bright and popular with men and women alike.

Dr. Bonner records an incident which an observer noted at the Mansion during Johnson's term as governor. "A piney woods plebe . . .," having satisfied himself at the food tables, went to an empty room and stood before a mirror. "He then took from his pocket a jack-knife and applied it vigorously to his teeth while gazing at his image with apparent satisfaction."

Although Johnson was quite democratic about his invitations, there were some people who believed they deserved a free meal without such a formality. One woman recalled seeing long poles with hooks slide through the open windows, only to be hastily retracted bearing a whole turkey or ham from the tables inside.

Economically speaking, times in the South were still good. Yet, the air was rural and abundances of material goods were unknown to most people. For example, one observer at an 1853 party at the Mansion described the ladies' gowns. Some, she said, "once had colors . . . which had yielded to the touch of time and water."

The move of Joseph Brown and his family to the Mansion provided another change. Elizabeth Gresham Brown worried about the cost of entertaining in the Governor's Mansion. Beef was 8¢ a pound, pork, 10¢, and butter, 40¢. She took comfort in saving money by raising vegetables in a garden on the Mansion's grounds.

As secession approached, the mood in the Mansion changed. When the Convention voted to secede in 1861, the town came alive. There were those who had fought the move, like ex-Governor Johnson, but citizens joined together under the decision. The night of the vote, the church bells rang and a torch light procession approached the Governor's Mansion, illuminated by lighted candles in tin holders in every window pane of the house.

In November 1864, Sherman reached the capital city. With foresight, the Governor had removed most of the Mansion's portable furnishings for safekeeping. He also took away a milk cow and provisions for the larder, a servant thinking to rescue several cabbages from Mrs. Brown's garden. His forethought meant that Sherman had to sleep on "an improvised bed and to use a table made from boards and camp chairs."

Upon his return, Brown found oil paintings slashed by sabers, the strips fluttering loose in their frames. Old law books were strewn over the floor, and what items had been left were ravaged. But the Yankees cannot bear the total responsibility of the destruction, for some of the looting had apparently been the work of local people.

Repair of the Mansion after Sherman's foray was nearly impossible because materials and tools were not available. Yet, the Mansion survived, relatively unscathed.

Although the war was over, the Mansion was still to be the residence for other governors. Provisional Governor James Johnson lived there for a short time until Governor Charles Jenkins moved in to begin his three year tenure in office. In fact, ex-Governor Brown and Provisional Governor Johnson lived in the Mansion simultaneously for a few weeks. As Mrs. Brown was to give birth to a son on October 5, 1865, the Brown family was allowed to remain at the Mansion until he was born and for six weeks after, until mother and child were able to travel.

Governor Jenkins lived in the Mansion until 1868 when he was removed from office. Although Provisional Governor General Thomas Ruger lived there for a few months in 1868, the Mansion's time of grandeur was past. The capital was moving to Atlanta.

Suggestions were made that the Mansion be transferred to the trustees of the state asylum. Others thought it should become part of a Negro State University. The government did neither. For a time it became a 25¢ a night flophouse and later a college dormitory. A quarter century after the war, it once again obtained mansion status by becoming the residence for presidents of the school that is now called Georgia College.

The strength of design and the quality of craftsmanship have allowed the Mansion to remain beautiful for 140 years. The basic layout of the house remains the same, renovations making the Mansion more accessible to the public, yet not totally incongruous to the lifestyle those early Georgia governors knew.

The size of the Mansion is still impressive. From the

(Top photo) In an eighteenth century Chippendale breakfront in the library, a small photograph of Governor George Gilmer, the first governor to occupy the Mansion, is surrounded by books from his law library. (Below) The view from the rotunda into the library.

32-inch solid brick walls on the ground floor to its massive Ionic columns and from the hand-carved front doors to the rotunda with its 50-foot floor-to-dome expanse, visitors feel its magnificence. There is elegance, too, in the original marble mantels and the fine millwork around the windows.

Like Milledgeville itself, recognized by the National Trust for Historic Preservation as the only surviving example of a complete Federal period (1780-1825) city, the furnishings of the house reflect that time. Two particularly interesting pieces are Georgia-made: a two-drawer table of walnut and pine, now used in the dining room and a birch sideboard in the game room.

Silk and brocade and fine masonry aside, the Mansion was still home for many families. The kitchen, with its intricately planned oven, its original square bricks and its open fireplace, is still warm and inviting. Joseph Brown's recliner and Howell Cobb's china make us remember other days of living, of restful moments and festive levees. Even the quiet reserve of the upper story where Georgia College President Dr. J. Whitney Bunting and his family live makes the Mansion more than a mansion. It is, after all, the living which makes the house.

Standing in that grand rotunda with its wooden railing, picturing Governor Brown answering the waiting soldier is easy. Pleasant and informed tour guides who have genuine affection for the Mansion made visitors' impressions of Georgia life in the mid-nineteenth century even more vivid.

The sun still sparkles on the chandeliers and the sound of footsteps comes from overhead. And the Mansion, a treasure from Georgia's past, survives, its pink walls reflecting the Georgia clay as clearly as ever.

The Mansion is open for touring on Tuesdays, Thursdays, Fridays and Saturdays from 10 a.m. until 12 noon and on Tuesdays, Thursdays, Fridays, Saturdays and Sundays from 2 until 5 p.m. Admission is $1 for adults, .50 for students and .25 for groups of ten or more. For further information, write Mary Jo Thompson, Director of Mansion Tours, Georgia College, Box 517, Milledgeville, Georgia 31061 or call 912/453-4545.

Mary Eleanor Wickersham of Sandersville is a newspaper columnist and freelance writer. Kevin Schochat, also of Sandersville, is a freelance photographer. (Also see "Learning to Cope" on page 12.)

In the formal dining room is a collection of fine eighteenth and nineteenth century American furniture.

focus:

Georgia's Protected Species

By Mary Anne Neville-Young
and Ron Odom

Georgia's Protected Species Program began in 1973 with the enactment of two state laws. The Endangered Wildlife Act and the Wildflower Preservation Act not only laid the groundwork for species preservation within the state, but they also placed Georgia in the position of being one of only a few states to have a viable protected species program.

At present, Georgia legally provides protection for 23 species of plants. All of the wildlife listed, except for three species, also appear on the U.S. Department of Interior's Endangered Species list. These exceptions are the Sherman's Pocket Gopher, the Colonial Pocket Gopher, and the Georgia Blind Cave Salamander. Of the 58 species of plants listed on the Georgia list, two species—the Persistent Trillium (*Trillium persistens*) and Hairy Rattleweed (*Baptisia arachnifera*)—are federally listed. This listing is significant since plant listing by the Fish and Wildlife Service is proceeding slowly due to the difficult nature of determining a plant's status. At present only 17 plants are listed for the entire United States. Two of these are the ones listed in Georgia.

In October 1977, the state of Georgia became the twentieth state to receive federal grant-in-aid funds from the U.S. Fish and Wildlife Service to facilitate the development and operation of the endangered wildlife pro-

The Eastern brown pelican. Photo by Leonard Lee Rue III.

gram. These funds became available under Section 6 of the 1973 Endangered Species Act, PL 93-205. Under the grant-in-aid formula, a sum of 66⅔ matching funds can be allocated to a state meeting designated criteria. These criteria are generally based on the ability of a state to conserve wildlife as indicated by the development of successful conservation programs for protected species, the establishment of procedures by which to acquire habitat for protected species and the existence of proper mechanisms for public input into the listing of resident species.

Inherent in the language of this section of the Endangered Species Act was the fact that the federal government recognized that individual states were more familiar with the conservation needs of their resident wildlife than was the federal government. Unfortunately, the language of the Act was not interpreted to mean that plants should be included for cooperative fundings. Since many states were becoming motivated to initiate plant programs or, as in the case of Georgia, continuing development and implementation of a current program, the push was on to amend Section 6 of the 1973 law so that federal monies could be directed at states to continue their planning. In the summer of 1978, Georgia was a leader in pursuing an amendment to Section 6. Congress received letters from former Director of Game and Fish Jack Crockford supporting federal funding for plants and from the Commissioner of Natural Resources Joe Tanner. Tanner's letter stated: "The same type of criteria-based approval which qualified Georgia for cooperative funds for wildlife should be available for our protected plant program. Managing for both plant and wildlife species is a mutually compatible effort." When the new amendment is implemented, Fish and Wildlife Service officials state that Georgia should be one of the first states to qualify for funding.

Many aspects of Georgia's program contribute to the high profile it enjoys. Among these are the fact that the list of species legally protected in this state is credible and manageable. The 81 species listed are the result of careful scrutiny of proposed listed species. This resulted in a compilation which was composed of only those species and wildlife determined by experts to be in the most need of protection. The protected species program in Georgia is unique too, in that legislation exists to support the list of species This is in contrast to many states which may be only at the stage of list development and which, thus, have a long, unmanageable list with no enforcement authority. The Protected Species Program in Georgia has been actively engaged in in-service training for the department's 205 law enforcement officials. These conservation rangers support the program by virtue of their job of enforcing the provisions of the two state laws. However, they are very vital to the entire protected species program in that they represent trained individuals in the field who can be important to another important program effort, the range and status monitoring of protected plants and wildlife. More important, however, they represent a vehicle for the dispersion of factual material regarding protected species to the public. By the summer of 1979, ongoing in-service training will have been established with all departmental field personnel including those in Game Management, Fisheries, and Parks.

It is evident to the department personnel who are responsible for planning and implementing the protected species program that a good program cannot exist without cooperation from many sources. That is why a top priority of the program is education. The concept of education, as it applies to the program, must begin with an attempt to engender enthusiasm. Proper education will also alleviate fears that exist in regard to the words "endangered species." It must be made perfectly clear that no endangered species program was designed to stop progress or halt development. The programs, as they exist in the state, are to encourage early planning which carefully considers the impact of project activities on endangered species or their habitats. The Protected Plant and Wildlife Program has joined efforts numerous times to mitigate conflicts between a proposed project and a species protected under Georgia law. On the federal level many thousands of project conflicts have been resolved. This all speaks highly of the harmony which can and should exist between development and conservation interests.

Beginning next issue, articles will be appearing in *Outdoors in Georgia* discussing the state's protected species. These articles will discuss various aspects of endangerment and emphasize programs being carried out on state or federal levels to ensure a species' survival. In addition, articles will appear on some of our more unique species, ones which do not receive statutory protection as endangered or threatened but are still valuable resources whose populations need monitoring to assure they do not become endangered. These articles will represent the protected species program's continuing effort to increase positive awareness of the efforts directed toward conserving Georgia's natural heritages.

Persistent Trillium

A Kirtland's warbler with young. Left, the American alligator.

Georgia's Protected Wildlife

Scientific Name	Common Name	Status on Georgia List
Felis concolor cougar	Eastern Cougar	Endangered
Felis concolor coryi	Florida Cougar	Endangered
**Geomys colonus*	Colonial Pocket Gopher	Endangered
**Geomys fontanelus*	Sherman's Pocket Gopher	Endangered
Myotis grisescens	Gray Bat	Endangered
Myotis sodalis	Indiana Bat	Endangered
Eubalaena glacialis	Right Whale	Endangered
Megaptera novaengliae	Humpback Whale	Endangered
Trichechus manatus latirostris	Manatee	Endangered
Campephilus principalis	Ivory-billed Woodpecker	Endangered
Picoides borealis	Red-Cockaded Woodpecker	Endangered
Dendroica kirtlandii	Kirtland's Warbler	Endangered
Falco peregrinus anatum	Eastern Peregrine Falcon	Endangered
Falco peregrinus tundrius	Artic Peregrine Falcon	Endangered
Haliaeetus leucocephalus leucocephalus	Southern Bald Eagle	Endangered
Pelecanus occidentalis carolinensis	Eastern Brown Pelican	Endangered
Vermirora bachmanii	Bachman's Warbler	Endangered
Alligator mississippiensis	American Alligator	Endangered
Dermochelys coriacea coriacea	Leatherback Turtle	Endangered
Eretmochelys imbricata imbricata	Hawksbill Turtle	Endangered
Lepidochelys kempii	Atlantic Ridley Turtle	Endangered
Drymarchon corais couperi	Indigo Snake	Threatened
**Haiedo triton Wallacei*	Georgia Blind Cave Salamander	Endangered
Acipenser brevirostrum	Shortnose Sturgeon	Endangered
Typhlichthys subterraneus	Southern Cavefish	Endangered

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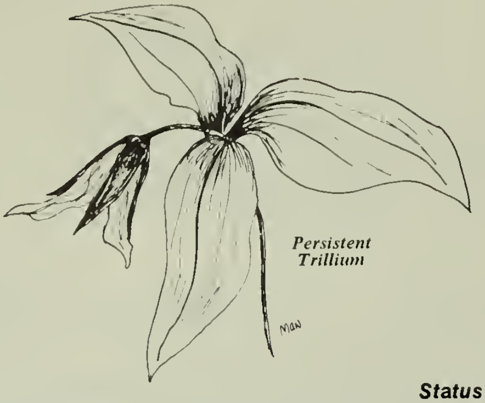
*These species only appear on the Georgia Protected Wildlife List. All others appear on both the state and federal list.



Georgia's Protected Plants

Scientific Name	Common Name	Status on Georgia List
Amphianthus pusillus	Amphianthus	Endangered
Arabis georgiana	Arbits or Rock-Cress	Threatened
Asplenium heteroresiliens	Spleenwort	Threatened
*Baptisia arachnifera***	Hairy Wild-indigo	Endangered
Bumelia thornei	Buckthorn	Endangered
Cacalia diversifolia	Indian-Plantain	Threatened
Calamintha dentata	Calamintha	Threatened
Carex amplisquama	Carex	Threatened
Carex biltmoreana	Carex	Threatened
Carex misera	Carex	Threatened
Carex purpurifera	Carex	Threatened
Croomia pauciflora	Croomia	Threatened
Cuscuta harperi	Cuscuta or Dodder	Threatened
Cypripedium acaule	Moccasin-Flower or Pink Lady's Slipper	Threatened
Cypripedium calceolus	Golden Slipper or Yellow Lady's Slipper	Threatened
Draba aprica	Draba or Whitlow-Wort	Endangered
Echinacea laevigata	Purple Cone-Flower	Threatened
Elliottia racemosa	Elliottia or Georgia Plume	Endangered
Fimbristylis perpusilla	Fimbristylis	Endangered
Fothergilla gardenii	Dwarf Witch-Alder	Threatened
Hartwrightia floridana	Hartwrightia	Threatened
Hydrastis canadensis	Golden Seal	Endangered
Hymenocallis coronaria	Spider-Lily	Endangered
Isoetes melanospora	Quillwort	Threatened
Jeffersonia diphylla	Twinleaf	Endangered
Leavenworthis exigua var. exigua	Leavenworthia	Threatened
Lindernia saxicola	False Pimpernel	Endangered
Litsea aestivalis	Pond-Bush or Pond Spice	Threatened
Lythrum curtissii	Loosestrife	Endangered
Myriophyllum laxum	Water-milfoil	Threatened
Nestronia umbellula	Nestronia	Threatened
Oxypolis canbyi	Cow-Bane or Hog Fennel	Threatened

Scientific Name	Common Name	Status on Georgia List
Panicum hirstii	Panic Grass	Endangered
Physostegia veroniciformis	False Dragon-Head	Threatened
Potentilla tridentata	Three-toothed Cinquefoil	Endangered
Quercus oglethorpensis	Oglethorpe Oak	Threatened
Rhododendron prunifolium	Plumleaf Azalea or Red Honeysuckle	Threatened
Salix floridana	Willow	Endangered
Sarracenia flava	Fly-Catchers or Golden Trumpet	
Sarracenia leucophylla	White Trumpet or Pitcher-plant	Threatened
Sarracenia minor	Hooded Pitcher-plant	Threatened
Sarracenia psittacina	Parrot Pitcher-plant	Threatened
Sarracenia purpurea	Flytrap or Indian-Pitcher	Endangered
Sarracenia rubra	Sweet Pitcher-plant	Endangered
Schisandra glabra	Schisandra or Wild Sarsparilla	Threatened
Schizachyrium niveum	Schizachyrium	Threatened
Scutellaria montana	Large-flowered Skullcap	Threatened
Sedum pusillum	Sedum or Stonecrop	Threatened
Senecio millefolium	Ragwort	Threatened
Shortia galacifolia	Oconee-Bells or Shortia	Endangered
Silene polypetala	Fringed Campion	Endangered
Thalictrum debile	Meadow Rue	Threatened
Torreya taxifolia	Stinking Cedar or Torreya	Endangered
Trientalis borealis	Star-Flower	Endangered
*Trillium persistens***	Persistent Trillium	Endangered
Veratrum woodii	False Hellebore	Endangered
Viburnum bracteatum	Arrow-Wood	Endangered
Waldsteinia lobata	Barren Strawberry	Threatened

**These species are protected by both federal and state legislation. All other plants listed here appear only on the state list.

1979 TIDE TABLES

This Tide Table for 1979 is furnished to you compliments of OUTDOORS IN GEORGIA for your use in coastal fishing and hunting. Fold it and put it in your tackle box, hunting coat, or wherever it will always be handy, for use all year long.

Predicted tide times and heights are shown for the Georgia coast at the bar at the Savannah River entrance. You may compute the tide times for other points listed by subtracting or adding hours and minutes as indicated. A plus time indicates a later tide and a minus time an earlier tide. Daylight saving time is not used in this table. All daily time predictions are based on Eastern Standard Time meridian. Predicted tjmes may be converted to daylight saving time by adding one hour to these data.

These data are from the **1979 Tide Tables for the East Coast of North and South America,** National Ocean Survey, U.S. Department of Commerce, Rockville, Md. 20852.

	DIFFERENCES Time	
GEORGIA Savannah River	**High Water Hrs./Min.**	**Low Water Hrs./Min.**
Tybee Light	−0 08	−0 15
Port Wentworth	+0 33	+0 41
Tybee Creek and Wassaw Sound		
Tybee Creek entrance	−0 07	−0 02
Thunderbolt	+0 34	+0 09
Isle of Hope, Skidaway River	+0 52	+0 25
Ossabaw Sound		
Egg Island	+0 06	+0 07
Fort McAlister, Ogeechee River	+0 50	+1 13
Cane Patch Creek entrance	+0 57	+0 40
St. Catherines and Sapelo Sounds		
Walburg Creek entrance	+0 25	+0 20
Kilkenny Club, Kilkenny Creek	+0 31	+0 13
Sunbury, Medway River	+0 56	+0 42
Blackbeard Island	+0 20	+0 19
Mud R., at Old Teakettle Cr.	+0 47	+0 43

	DIFFERENCES Time	
Doboy and Altamaha Sounds	**High Water Hrs./Min.**	**Low Water Hrs./Min.**
Blackbeard Cr., Blackbeard I.	+0 21	+0 44
Sapelo Island	+0 00	+0 02
Darien, Darien River	+1 10	+1 12
Wolf Island	+0 06	+0 35
Champney I., S. Altamaha R.	+1 12	+2 30
St. Simons Sound		
St. Simons Sound bar	+0 01	+0 05
St. Simons Light	+0 24	+0 28
Troup Cr. entr., Mackay R.	+0 54	+0 49
Brunswick, East River	+0 55	+0 40
St. Andrew Sound		
Jekyll Point	+0 28	+0 28
Jointer Island, Jointer Creek	+1 02	+0 49
Dover Bluff, Dover Creek	+0 57	+0 49
Cumberland Wh., Cumb. R.	+0 40	+0 42
Cumberland Sound		
St. Mary's Entr., north jetty	+0 15	+0 15
Crooked River entrance	+1 23	+1 12
Harritts Bluff, Crooked River	+2 09	+2 12
St. Marys, St. Marys River	+1 21	+1 13

SAVANNAH RIVER ENTRANCE, GA., 1979

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

JANUARY						FEBRUARY						MARCH					
DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.
1	0341	-1.4	16	0350	-0.3	1	0511	-1.2	16	0439	-0.2	1	0400	-1.6	16	0339	-0.4
M	0953	8.2	TU	0942	6.8	TH	1125	7.3	F	1027	6.6	TH	1008	7.7	F	0922	6.8
	1621	-1.3		1614	-0.1		1741	-1.3		1651	-0.1		1626	-1.6		1547	-0.2
	2214	7.3		2203	6.0		2349	7.2		2250	6.4		2229	7.8		2143	7.0
2	0434	-1.2	17	0427	-0.1	2	0605	-0.7	17	0520	0.0	2	0451	-1.2	17	0416	-0.3
TU	1048	7.9	W	1018	6.7	F	1218	6.8	SA	1108	6.4	F	1059	7.2	SA	0958	6.7
	1712	-1.2		1648	0.0		1834	-0.9		1731	0.0		1712	-1.2		1621	-0.2
	2312	7.1		2240	6.0					2336	6.5		2320	7.4		2223	7.0
3	0528	-0.8	18	0506	0.1	3	0044	6.9	18	0607	0.2	3	0541	-0.6	18	0458	-0.1
W	1146	7.5	TH	1058	6.5	SA	0703	-0.2	SU	1154	6.2	SA	1149	6.7	SU	1043	6.5
	1807	-1.0		1725	0.1		1314	6.3		1818	0.0		1802	-0.7		1702	-0.1
				2322	6.0		1930	-0.5								2309	7.0
4	0013	7.0	19	0549	0.3	4	0143	6.6	19	0027	6.5	4	0013	7.0	19	0544	0.1
TH	0629	-0.5	F	1140	6.3	SU	0806	0.1	M	0701	0.4	SU	0633	-0.1	M	1130	6.4
	1244	7.0		1807	0.2		1412	5.9		1246	6.1		1242	6.2		1749	0.1
	1904	-0.7					2029	-0.3		1914	0.1		1855	-0.2			
5	0113	6.8	20	0010	6.0	5	0242	6.4	20	0124	6.5	5	0105	6.6	20	0002	6.9
F	0732	-0.1	SA	0639	0.4	M	0908	0.3	TU	0809	0.4	M	0732	0.4	TU	0639	0.3
	1342	6.6		1226	6.1		1512	5.7		1345	6.0		1337	5.8		1223	6.2
	2003	-0.6		1857	0.2		2127	-0.2		2019	0.0		1954	0.1		1849	0.2
6	0215	6.8	21	0101	6.1	6	0345	6.3	21	0228	6.6	6	0201	6.3	21	0100	6.8
SA	0837	0.1	SU	0739	0.5	TU	1007	0.4	W	0914	0.2	TU	0832	0.7	W	0744	0.4
	1442	6.3		1319	6.0		1617	5.6		1450	6.0		1437	5.5		1326	6.2
	2103	-0.5		1952	0.1		2222	-0.2		2127	-0.2		2052	0.3		1956	0.2
7	0317	6.7	22	0158	6.3	7	0445	6.4	22	0340	6.8	7	0303	6.1	22	0207	6.8
SU	0937	0.1	M	0841	0.4	W	1059	0.3	TH	1017	-0.1	W	0933	0.7	TH	0852	0.3
	1546	6.1		1415	6.0		1713	5.6		1602	6.2		1540	5.5		1434	6.2
	2158	-0.5		2053	0.0		2311	-0.3		2230	-0.6		2151	0.3		2108	0.0
8	0418	6.8	23	0300	6.5	8	0539	6.5	23	0452	7.2	8	0406	6.1	23	0321	6.9
M	1036	0.1	TU	0944	0.2	TH	1148	0.2	F	1118	-0.6	TH	1026	0.6	F	0958	-0.1
	1646	6.0		1520	6.0		1803	5.8		1710	6.7		1642	5.6		1545	6.5
	2249	-0.5		2153	-0.4					2331	-1.0		2243	0.2		2217	-0.3
9	0515	6.9	24	0407	6.8	9	0000	-0.4	24	0556	7.6	9	0503	6.3	24	0433	7.2
TU	1126	0.0	W	1041	-0.2	F	0622	6.7	SA	1215	-1.0	F	1115	0.5	SA	1057	-0.5
	1742	6.0		1625	6.2		1235	0.0		1814	7.2		1734	5.8		1658	7.0
	2337	-0.6		2252	-0.7		1845	6.0					2332	0.0		2318	-0.8
10	0607	7.0	25	0513	7.3	10	0045	-0.5	25	0030	-1.4	10	0552	6.5	25	0539	7.6
W	1215	0.0	TH	1139	-0.6	SA	0702	6.9	SU	0652	8.0	SA	1201	0.3	SU	1152	-1.0
	1828	6.1		1731	6.5		1317	-0.1		1309	-1.4		1819	6.1		1800	7.6
				2348	-1.1		1922	6.2		1909	7.7						
11	0024	-0.6	26	0612	7.7	11	0128	-0.6	26	0126	-1.7	11	0019	-0.2	26	0016	-1.2
TH	0647	7.2	F	1235	-1.0	SU	0738	7.0	M	0743	8.3	SU	0633	6.7	M	0635	7.9
	1301	-0.1		1828	6.9		1357	-0.2		1401	-1.7		1245	0.1		1246	-1.3
	1909	6.2					1957	6.3		2000	8.0		1856	6.4		1854	8.1
12	0109	-0.6	27	0045	-1.5	12	0209	-0.6	27	0220	-1.9	12	0101	-0.4	27	0110	-1.5
F	0726	7.2	SA	0707	8.1	M	0811	7.0	TU	0831	8.3	M	0710	6.9	TU	0726	8.1
	1345	-0.2		1330	-1.4		1435	-0.3		1451	-1.9		1325	-0.1		1338	-1.6
	1946	6.2		1922	7.3		2028	6.3		2050	8.1		1931	6.6		1944	8.4
13	0153	-0.6	28	0141	-1.8	13	0248	-0.6	28	0312	-1.8	13	0144	-0.5	28	0203	-1.6
SA	0801	7.2	SU	0758	8.4	TU	0843	6.9	W	0920	8.1	TU	0744	7.0	W	0812	8.1
	1424	-0.2		1421	-1.7		1509	-0.3		1539	-1.8		1403	-0.2		1426	-1.7
	2019	6.2		2015	7.6		2100	6.4		2139	8.0		2003	6.8		2030	8.5
14	0232	-0.6	29	0234	-1.9	14	0326	-0.5				14	0223	-0.5	29	0254	-1.5
SU	0835	7.1	M	0848	8.4	W	0915	6.8				W	0816	7.0	TH	0858	7.9
	1502	-0.2		1512	-1.8		1542	-0.3					1439	-0.3		1512	-1.5
	2053	6.1		2106	7.7		2134	6.4					2034	6.9		2117	8.4
15	0311	-0.5	30	0327	-1.8	15	0403	-0.4				15	0302	-0.5	30	0340	-1.3
M	0908	7.0	TU	0939	8.2	TH	0949	6.7				TH	0848	6.9	F	0944	7.5
	1539	-0.1		1602	-1.8		1618	-0.2					1511	-0.3		1558	-1.2
	2126	6.1		2158	7.6		2211	6.4					2106	7.0		2203	8.1
			31	0419	-1.6										31	0427	-0.9
			W	1030	7.8										SA	1032	7.0
				1651	-1.6											1643	-0.8
				2253	7.4											2251	7.6

TIME MERIDIAN 75° W. 0000 IS MIDNIGHT. 1200 IS NOON.
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SAVANNAH RIVER ENTRANCE, GA., 1979

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

APRIL						MAY						JUNE					
DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.
1	0514	-0.4	16	0440	-0.2	1	0533	0.2	16	0517	-0.3	1	0631	0.6	16	0025	7.3
SU	1120	6.6	M	1021	6.6	TU	1136	6.1	W	1104	6.6	F	1236	5.8	SA	0655	-0.6
	1730	-0.3		1643	-0.1		1746	0.4		1722	-0.1		1854	0.9		1258	6.9
	2338	7.2		2251	7.4		2351	6.8		2336	7.5					1918	0.1
2	0602	0.1	17	0528	0.0	2	0620	0.6	17	0612	-0.2	2	0045	6.3	17	0125	7.0
M	1210	6.1	TU	1114	6.5	W	1226	5.8	TH	1205	6.6	SA	0722	0.7	SU	0755	-0.5
	1821	0.2		1732	0.1		1838	0.8		1823	0.2		1326	5.8		1401	7.1
				2344	7.2								1950	1.0		2025	0.1
3	0029	6.7	18	0625	0.2	3	0039	6.5	18	0036	7.2	3	0134	6.2	18	0228	6.8
TU	0654	0.6	W	1210	6.4	TH	0713	0.8	F	0713	-0.1	SU	0814	0.7	M	0854	-0.6
	1303	5.8		1833	0.3		1319	5.7		1308	6.6		1419	6.0		1506	7.2
	1916	0.6					1935	1.0		1931	0.3		2048	1.0		2129	0.1
4	0121	6.4	19	0047	7.1	4	0129	6.2	19	0140	7.0	4	0224	6.1	19	0332	6.6
W	0754	0.9	TH	0728	0.3	F	0809	0.9	SA	0815	-0.2	M	0906	0.5	TU	0951	-0.7
	1358	5.6		1315	6.4		1412	5.7		1415	6.8		1514	6.2		1609	7.4
	2015	0.8		1943	0.4		2034	1.0		2041	0.2		2142	0.8		2228	-0.1
5	0217	6.1	20	0153	7.0	5	0223	6.1	20	0246	6.9	5	0320	6.1	20	0438	6.5
TH	0852	1.0	F	0834	0.1	SA	0903	0.9	SU	0917	-0.4	TU	0956	0.3	W	1044	-0.8
	1458	5.6		1424	6.5		1509	5.8		1522	7.1		1607	6.5		1708	7.7
	2115	0.8		2055	0.2		2132	0.9		2148	0.0		2233	0.5		2324	-0.2
6	0316	6.1	21	0304	7.0	6	0319	6.1	21	0356	6.9	6	0415	6.2	21	0534	6.6
F	0948	0.9	SA	0938	-0.2	SU	0953	0.7	M	1015	-0.7	W	1042	0.1	TH	1134	-0.8
	1559	5.7		1535	6.8		1607	6.1		1628	7.5		1658	6.9		1800	7.9
	2210	0.6		2201	-0.1		2222	0.6		2247	-0.3		2323	0.2			
7	0415	6.2	22	0415	7.1	7	0415	6.2	22	0457	7.0	7	0507	6.3	22	0016	-0.3
SA	1038	0.7	SU	1036	-0.6	M	1041	0.4	TU	1108	-0.9	TH	1128	-0.2	F	0625	6.6
	1654	6.0		1644	7.3		1658	6.5		1726	7.9		1747	7.3		1225	-0.8
	2300	0.4		2303	-0.5		2313	0.4		2342	-0.5					1848	8.0
8	0507	6.4	23	0519	7.4	8	0507	6.4	23	0556	7.1	8	0011	-0.1	23	0105	-0.3
SU	1123	0.4	M	1131	-0.9	TU	1126	0.2	W	1158	-1.1	F	0600	6.5	SA	0712	6.6
	1743	6.4		1745	7.9		1742	6.9		1819	8.2		1214	-0.4		1311	-0.7
	2347	0.1					2358	0.1					1833	7.7		1929	7.9
9	0553	6.6	24	0000	-0.8	9	0553	6.6	24	0035	-0.7	9	0101	-0.3	24	0152	-0.3
M	1206	0.2	TU	0616	7.6	W	1208	0.0	TH	0645	7.1	SA	0645	6.7	SU	0754	6.5
	1822	6.7		1222	-1.2		1823	7.3		1248	-1.1		1301	-0.6		1357	-0.6
				1837	8.3					1907	8.3		1917	8.0		2009	7.8
10	0032	-0.1	25	0054	-1.1	10	0044	-0.2	25	0125	-0.7	10	0147	-0.6	25	0236	-0.3
TU	0635	6.8	W	0707	7.7	TH	0635	6.7	F	0731	7.1	SU	0730	6.8	M	0834	6.4
	1246	0.0		1312	-1.3		1249	-0.2		1336	-1.0		1347	-0.7		1441	-0.4
	1858	7.0		1924	8.6		1903	7.6		1950	8.3		2001	8.2		2047	7.6
11	0114	-0.3	26	0145	-1.2	11	0127	-0.3	26	0213	-0.7	11	0235	-0.7	26	0316	-0.2
W	0710	6.9	TH	0752	7.7	F	0715	6.9	SA	0815	6.9	M	0817	6.9	TU	0911	6.3
	1325	-0.1		1401	-1.3		1330	-0.3		1421	-0.8		1437	-0.8		1523	-0.2
	1933	7.3		2010	8.6		1940	7.9		2031	8.1		2047	8.2		2124	7.4
12	0156	-0.4	27	0233	-1.1	12	0212	-0.5	27	0259	-0.5	12	0324	-0.8	27	0356	0.0
TH	0746	7.0	F	0838	7.5	SA	0754	6.9	SU	0857	6.7	TU	0905	7.0	W	0950	6.1
	1405	-0.2		1447	-1.2		1412	-0.4		1506	-0.6		1526	-0.7		1603	0.0
	2007	7.5		2054	8.4		2021	8.0		2111	7.9		2136	8.1		2200	7.1
13	0237	-0.5	28	0319	-0.9	13	0255	-0.5	28	0341	-0.3	13	0413	-0.8	28	0434	0.1
F	0821	7.0	SA	0921	7.1	SU	0836	6.9	M	0936	6.4	W	0958	6.9	TH	1029	6.0
	1442	-0.3		1531	-0.9		1455	-0.4		1549	-0.3		1619	-0.6		1645	0.3
	2041	7.6		2136	8.1		2101	8.0		2150	7.5		2229	7.9		2240	6.9
14	0316	-0.4	29	0405	-0.6	14	0340	-0.5	29	0422	-0.1	14	0504	-0.8	29	0512	0.3
SA	0857	6.9	SU	1005	6.8	M	0921	6.8	TU	1019	6.2	TH	1056	6.9	F	1112	6.0
	1518	-0.3		1615	-0.5		1540	-0.4		1631	0.1		1712	-0.4		1727	0.6
	2119	7.6		2219	7.6		2147	7.9		2231	7.1		2325	7.6		2320	6.7
15	0357	-0.3	30	0448	-0.2	15	0427	-0.4	30	0504	0.2	15	0557	-0.7	30	0553	0.4
SU	0938	6.8	M	1050	6.4	TU	1009	6.7	W	1103	6.0	F	1157	6.9	SA	1154	6.0
	1558	-0.2		1659	0.0		1627	-0.3		1714	0.4		1813	-0.1		1813	0.8
	2202	7.5		2304	7.2		2239	7.7		2313	6.8						
									31	0546	0.4						
									TH	1149	5.8						
										1802	0.7						
										2359	6.5						

TIME MERIDIAN 75° W. 0000 IS MIDNIGHT. 1200 IS NOON.
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SAVANNAH RIVER ENTRANCE, GA., 1979
TIMES AND HEIGHTS OF HIGH AND LOW WATERS

JULY

DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.
1	0003	6.5	16	0106	7.0
SU	0636	0.5	M	0729	-0.6
	1242	6.0		1342	7.3
	1906	1.0		2004	0.2
2	0049	6.3	17	0208	6.6
M	0724	0.5	TU	0829	-0.5
	1329	6.1		1444	7.3
	2003	1.0		2108	0.3
3	0139	6.2	18	0310	6.4
TU	0817	0.5	W	0927	-0.4
	1421	6.3		1545	7.3
	2058	0.9		2209	0.3
4	0230	6.1	19	0413	6.2
W	0909	0.3	TH	1021	-0.4
	1517	6.6		1646	7.4
	2155	0.7		2303	0.3
5	0327	6.1	20	0515	6.2
TH	1001	0.1	F	1113	-0.4
	1617	7.0		1741	7.5
	2249	0.3		2355	0.2
6	0426	6.2	21	0608	6.3
F	1051	-0.2	SA	1203	-0.4
	1713	7.4		1827	7.6
	2340	0.0			
7	0526	6.4	22	0045	0.1
SA	1142	-0.5	SU	0653	6.4
	1806	7.8		1249	-0.4
				1909	7.7
8	0032	-0.3	23	0128	0.0
SU	0619	6.7	M	0734	6.4
	1235	-0.7		1334	-0.3
	1856	8.2		1946	7.6
9	0124	-0.6	24	0211	0.0
M	0711	7.0	TU	0812	6.5
	1327	-0.9		1418	-0.2
	1945	8.4		2023	7.6
10	0216	-0.9	25	0251	0.0
TU	0802	7.2	W	0846	6.4
	1420	-1.0		1458	-0.1
	2033	8.5		2057	7.4
11	0306	-1.1	26	0327	0.0
W	0854	7.4	TH	0921	6.4
	1513	-1.1		1536	0.1
	2124	8.4		2131	7.2
12	0355	-1.2	27	0403	0.1
TH	0947	7.4	F	0954	6.4
	1606	-0.9		1616	0.3
	2216	8.2		2206	7.1
13	0445	-1.2	28	0437	0.2
F	1043	7.4	SA	1033	6.4
	1659	-0.7		1656	0.5
	2312	7.8		2243	6.9
14	0538	-1.0	29	0514	0.3
SA	1141	7.4	SU	1114	6.4
	1757	-0.3		1736	0.7
				2324	6.7
15	0009	7.4	30	0553	0.4
SU	0631	-0.8	M	1157	6.4
	1242	7.3		1824	0.9
	1858	0.0			
			31	0009	6.5
			TU	0638	0.5
				1244	6.5
				1919	1.1

AUGUST

DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.
1	0052	6.3	16	0245	6.3
W	0728	0.5	TH	0901	0.1
	1337	6.6		1520	7.2
	2019	1.1		2144	0.8
2	0148	6.2	17	0348	6.2
TH	0825	0.5	F	0957	0.2
	1434	6.8		1621	7.2
	2119	0.9		2239	0.8
3	0248	6.2	18	0452	6.2
F	0924	0.2	SA	1050	0.2
	1538	7.1		1718	7.3
	2217	0.6		2331	0.7
4	0352	6.3	19	0547	6.3
SA	1022	-0.1	SU	1139	0.1
	1641	7.5		1806	7.4
	2313	0.2			
5	0457	6.6	20	0016	0.5
SU	1118	-0.4	M	0632	6.5
	1743	8.0		1225	0.1
				1848	7.6
6	0008	-0.2	21	0101	0.4
M	0558	7.0	TU	0712	6.7
	1215	-0.7		1311	0.0
	1838	8.4		1924	7.6
7	0102	-0.7	22	0142	0.3
TU	0654	7.5	W	0746	6.8
	1311	-1.0		1352	0.0
	1929	8.7		1957	7.6
8	0154	-1.0	23	0220	0.2
W	0747	7.8	TH	0819	6.9
	1406	-1.2		1433	0.1
	2019	8.8		2029	7.6
9	0245	-1.3	24	0256	0.2
TH	0839	8.0	F	0851	7.0
	1459	-1.2		1510	0.2
	2109	8.7		2102	7.5
10	0334	-1.4	25	0331	0.3
F	0931	8.1	SA	0923	7.0
	1552	-1.0		1549	0.3
	2200	8.4		2134	7.3
11	0424	-1.3	26	0403	0.3
SA	1026	8.1	SU	0958	7.0
	1643	-0.7		1626	0.5
	2252	8.0		2208	7.1
12	0514	-1.1	27	0437	0.4
SU	1122	7.9	M	1035	7.0
	1738	-0.3		1704	0.8
	2348	7.5		2248	6.9
13	0605	-0.7	28	0514	0.6
M	1220	7.7	TU	1117	7.0
	1836	0.1		1749	1.0
				2330	6.7
14	0043	7.0	29	0556	0.7
TU	0701	-0.3	W	1207	7.0
	1318	7.5		1840	1.2
	1939	0.5			
15	0143	6.6	30	0021	6.6
W	0801	0.0	TH	0647	0.8
	1416	7.3		1300	7.0
	2043	0.8		1942	1.3
			31	0117	6.5
			F	0749	0.7
				1400	7.1
				2047	1.1

SEPTEMBER

DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.
1	0218	6.5	16	0423	6.3
SA	0855	0.6	SU	1023	0.7
	1508	7.3		1646	7.2
	2150	0.8		2302	1.0
2	0327	6.6	17	0519	6.5
SU	0959	0.2	M	1113	0.6
	1618	7.7		1737	7.3
	2249	0.4		2347	0.8
3	0436	7.0	18	0604	6.8
M	1100	-0.2	TU	1200	0.4
	1723	8.1		1819	7.5
	2345	-0.2			
4	0542	7.5	19	0028	0.6
TU	1158	-0.6	W	0645	7.1
	1819	8.6		1245	0.3
				1854	7.6
5	0040	-0.6	20	0109	0.5
W	0638	8.1	TH	0718	7.3
	1255	-0.9		1325	0.2
	1912	8.9		1928	7.7
6	0132	-1.0	21	0146	0.4
TH	0731	8.5	F	0750	7.4
	1349	-1.1		1406	0.2
	2001	9.0		2001	7.7
7	0222	-1.3	22	0222	0.3
F	0822	8.8	SA	0821	7.5
	1442	-1.1		1444	0.3
	2050	8.9		2031	7.6
8	0313	-1.3	23	0256	0.4
SA	0912	8.8	SU	0853	7.6
	1534	-0.9		1521	0.4
	2139	8.5		2105	7.5
9	0359	-1.2	24	0329	0.4
SU	1003	8.7	M	0925	7.6
	1625	-0.6		1558	0.6
	2229	8.1		2138	7.3
10	0448	-0.8	25	0405	0.5
M	1056	8.4	TU	1005	7.5
	1717	-0.1		1639	0.8
	2322	7.5		2219	7.1
11	0538	-0.4	26	0442	0.6
TU	1151	8.0	W	1048	7.5
	1812	0.4		1722	1.0
				2301	6.9
12	0018	7.0	27	0525	0.8
W	0631	0.1	TH	1136	7.4
	1247	7.6		1815	1.2
	1910	0.9		2354	6.7
13	0116	6.6	28	0618	0.9
TH	0730	0.5	F	1233	7.4
	1346	7.3		1915	1.3
	2013	1.2			
14	0217	6.3	29	0053	6.7
F	0832	0.8	SA	0721	1.0
	1446	7.1		1335	7.4
	2116	1.3		2022	1.2
15	0322	6.2	30	0158	6.7
SA	0930	0.8	SU	0834	0.8
	1551	7.1		1446	7.5
	2212	1.2		2128	0.8

TIME MERIDIAN 75° W. 0000 IS MIDNIGHT. 1200 IS NOON.
HEIGHTS ARE REFERRED TO MEAN LOW WATER WHICH IS THE CHART DATUM OF SOUNDINGS.

SAVANNAH RIVER ENTRANCE, GA., 1979
TIMES AND HEIGHTS OF HIGH AND LOW WATERS

OCTOBER						NOVEMBER						DECEMBER					
DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.	DAY	TIME h.m.	HT. ft.
1	0311	6.9	16	0444	6.6	1	0510	8.1	16	0531	7.0	1	0550	8.3	16	0534	7.0
M	0943	0.5	TU	1044	0.9	TH	1129	-0.3	F	1142	0.5	SA	1206	-0.5	SU	1152	0.1
	1556	7.8		1654	7.1		1742	8.1		1739	6.9		1818	7.4		1742	6.4
	2228	0.3		2310	0.9		2353	-0.8		2353	0.3					2358	-0.2
2	0421	7.4	17	0531	6.9	2	0608	8.7	17	0612	7.4	2	0024	-1.1	17	0619	7.4
TU	1044	0.1	W	1131	0.7	F	1224	-0.6	SA	1227	0.3	SU	0643	8.5	M	1241	-0.1
	1702	8.1		1740	7.3		1835	8.3		1820	7.0		1259	-0.7		1827	6.6
	2323	-0.2		2352	0.7								1907	7.5			
3	0525	8.0	18	0611	7.2	3	0045	-1.1	18	0034	0.1	3	0112	-1.2	18	0043	-0.4
W	1142	-0.4	TH	1214	0.5	SA	0657	9.0	SU	0648	7.7	M	0730	8.6	TU	0701	7.7
	1800	8.5		1819	7.4		1316	-0.8		1309	0.1		1349	-0.7		1327	-0.3
							1923	8.3		1857	7.1		1952	7.4		1911	6.8
4	0016	-0.7	19	0032	0.5	4	0134	-1.1	19	0115	0.0	4	0201	-1.1	19	0129	-0.6
TH	0624	8.6	F	0648	7.5	SU	0746	9.2	M	0725	7.9	TU	0812	8.5	W	0742	7.9
	1238	-0.7		1256	0.3		1408	-0.8		1353	0.0		1438	-0.6		1414	-0.5
	1853	8.8		1854	7.5		2010	8.1		1936	7.2		2035	7.2		1955	6.9
5	0107	-1.0	20	0110	0.4	5	0223	-1.1	20	0154	-0.1	5	0247	-0.9	20	0215	-0.7
F	0715	9.0	SA	0720	7.7	M	0831	9.1	TU	0803	8.0	W	0856	8.2	TH	0827	8.0
	1333	-0.9		1338	0.3		1455	-0.6		1434	0.0		1521	-0.4		1500	-0.6
	1942	8.9		1929	7.5		2055	7.8		2015	7.1		2119	6.9		2041	6.9
6	0158	-1.2	21	0147	0.3	6	0309	-0.8	21	0235	-0.1	6	0332	-0.6	21	0302	-0.8
SA	0804	9.2	SU	0754	7.9	TU	0917	8.8	W	0841	8.0	TH	0938	7.9	F	0910	8.0
	1425	-0.9		1418	0.3		1542	-0.3		1517	0.0		1606	-0.1		1546	-0.6
	2030	8.7		2003	7.5		2141	7.4		2053	7.1		2202	6.6		2127	6.9
7	0247	-1.2	22	0223	0.3	7	0355	-0.5	22	0317	-0.1	7	0415	-0.2	22	0351	-0.7
SU	0851	9.2	M	0827	8.0	W	1003	8.3	TH	0923	8.0	F	1021	7.5	SA	1000	7.8
	1515	-0.7		1457	0.3		1628	0.1		1602	0.1		1648	0.2		1634	-0.6
	2116	8.4		2036	7.4		2228	7.0		2138	6.9		2248	6.3		2219	6.9
8	0334	-0.9	23	0259	0.3	8	0441	0.0	23	0402	0.0	8	0459	0.1	23	0439	-0.6
M	0939	8.9	TU	0900	8.0	TH	1051	7.8	F	1011	7.8	SA	1104	7.1	SU	1051	7.6
	1605	-0.4		1536	0.4		1717	0.5		1648	0.2		1730	0.5		1724	-0.6
	2206	7.9		2113	7.2		2317	6.6		2229	6.8		2333	6.0		2317	6.8
9	0421	-0.6	24	0338	0.4	9	0528	0.5	24	0451	0.1	9	0546	0.5	24	0536	-0.4
TU	1029	8.5	W	0940	7.9	F	1138	7.4	SA	1103	7.6	SU	1149	6.7	M	1149	7.3
	1653	0.1		1618	0.6		1805	0.9		1740	0.3		1817	0.7		1819	-0.5
	2256	7.4		2154	7.1					2325	6.7						
10	0509	-0.1	25	0417	0.5	10	0009	6.3	25	0548	0.3	10	0021	5.9	25	0017	6.8
W	1122	8.1	TH	1024	7.8	SA	0621	0.9	SU	1201	7.4	M	0635	0.8	TU	0638	-0.1
	1744	0.6		1704	0.8		1228	7.0		1839	0.3		1234	6.5		1247	7.0
	2348	6.9		2243	6.9		1858	1.2					1906	0.8		1919	-0.4
11	0601	0.4	26	0503	0.6	11	0105	6.1	26	0029	6.7	11	0111	5.8	26	0120	6.9
TH	1215	7.6	F	1117	7.6	SU	0718	1.2	M	0651	0.5	TU	0731	1.0	W	0745	0.0
	1839	1.1		1755	0.9		1321	6.7		1303	7.2		1321	6.3		1350	6.7
				2336	6.8		1956	1.3		1940	0.2		1959	0.8		2019	-0.5
12	0044	6.5	27	0559	0.8	12	0159	6.0	27	0135	6.9	12	0203	5.9	27	0226	7.0
F	0657	0.9	SA	1213	7.5	M	0817	1.3	TU	0803	0.5	W	0828	1.0	TH	0853	0.0
	1311	7.2		1855	1.0		1414	6.6		1409	7.1		1413	6.1		1455	6.6
	1939	1.4					2051	1.2		2044	0.0		2052	0.7		2120	-0.6
13	0144	6.3	28	0039	6.7	13	0258	6.1	28	0242	7.1	13	0257	6.0	28	0332	7.1
SA	0757	1.2	SU	0706	0.9	TU	0914	1.2	W	0911	0.3	TH	0924	0.9	F	0956	-0.1
	1407	7.0		1318	7.4		1509	6.5		1516	7.1		1506	6.1		1601	6.5
	2039	1.5		2001	0.9		2142	1.0		2143	-0.3		2141	0.5		2217	-0.8
14	0247	6.2	29	0147	6.8	14	0354	6.4	29	0350	7.4	14	0353	6.3	29	0436	7.4
SU	0858	1.2	M	0816	0.8	W	1007	1.0	TH	1015	0.0	F	1017	0.7	SA	1054	-0.3
	1506	6.9		1427	7.4		1603	6.6		1622	7.2		1601	6.1		1705	6.5
	2135	1.4		2106	0.6		2228	0.8		2239	-0.7		2230	0.3		2310	-1.0
15	0347	6.3	30	0256	7.1	15	0446	6.7	30	0454	7.9	15	0444	6.6	30	0534	7.6
M	0953	1.1	TU	0927	0.5	TH	1054	0.7	F	1113	-0.3	SA	1105	0.4	SU	1150	-0.4
	1603	6.9		1537	7.6		1654	6.7		1724	7.3		1652	6.3		1801	6.6
	2226	1.2		2205	0.1		2311	0.5		2332	-0.9		2315	0.0			
			31	0407	7.6										31	0003	-1.1
			W	1030	0.1										M	0627	7.8
				1642	7.8											1242	-0.5
				2302	-0.4											1851	6.7

TIME MERIDIAN 75° W. 0000 IS MIDNIGHT. 1200 IS NOON.
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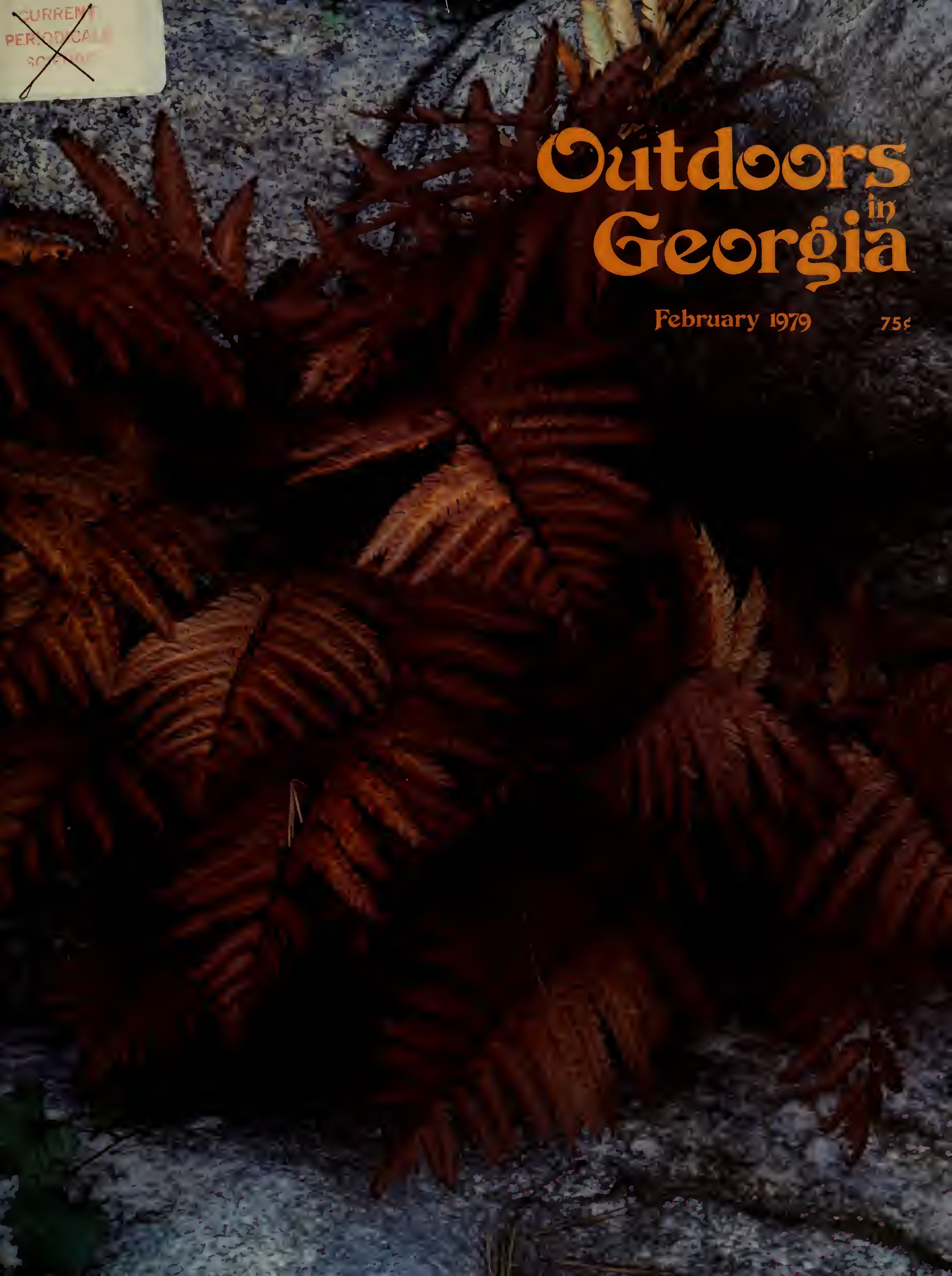

Outdoors in Georgia

February 1979

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Outdoors in Georgia

Volume 9 February 1979 Number 2

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Outdoor Commentary

Winter Happenings

DNR's Parks, Recreation and Historic Sites Division offers a variety of special events and programs throughout the year (even during the winter) at the state's 43 parks and 11 historic sites. One of the most interesting—and most popular—is the Fireside Craft/Art Show held each February at Unicoi State Park's Lodge and Conference Center. This year's show, set for February 17-18, will bring together about fifty of the Southeast's most creative artisans. Of course, anyone familiar with the show knows that this is nothing unusual. Now in its fourth year, Unicoi's arts and crafts bonanza continues to attract thousands, and for a very good reason.

In addition to a variety of paintings, sketches, macrame, pottery, quilting, stained glass and handmade dolls, visitors to the show can see and buy some most unusual craft items. The craft demonstrations ongoing during both days of the event are sure to intrigue you, and, true to the billing of the event, there'll be a roaring fire in the lodge's big fireplace to warm you.

Unicoi is one of the state's most popular and best-known state parks. Nestled in the mountains above Helen, the park is literally jammed with sightseers during the fall when north Georgia's leaves are at their most colorful. But in winter, the park can be a quiet getaway retreat, especially when blanketed by the white of an overnight snowfall. Unicoi has plenty of facilities for overnighters: 102 campsites for the hardy; 20 fully furnished cabins, complete with fireplaces; and a 60-room lodge with a beautiful view, warm fireplaces and lots of good food.

Unicoi is located on Highway 356, just north of Helen. Make your plans now so you won't miss the Fireside Craft/Art Show, February 17-18. Hours for the show are from 10 until 6 both Saturday and Sunday. There is no charge.

A couple of other special events need to be mentioned now, too, so you can plan ahead. The first weekend in March (March 2-3), Unicoi will be the site of a turkey hunting workshop. Experts will be on hand to teach and discuss hunting skills and techniques, including turkey calling, as well as turkey management. And parks personnel are urging interested people to pre-register for the Spring Orienteering Meet, scheduled for March 24-25 at F. D. Roosevelt State Park near Pine Mountain. Registration is $1. Call (404) 656-7092 to reserve your place. The "Wintertime at Fort Mountain" Photo Contest runs from February 15 to March 15. For registration and more information, call or send self-addressed, stamped envelope to Fort Mountain State Park, Chatsworth 30705. (404) 695-2621.

For more information about scheduled events or about any state park or historic site in Georgia, call (404) 656-3530.

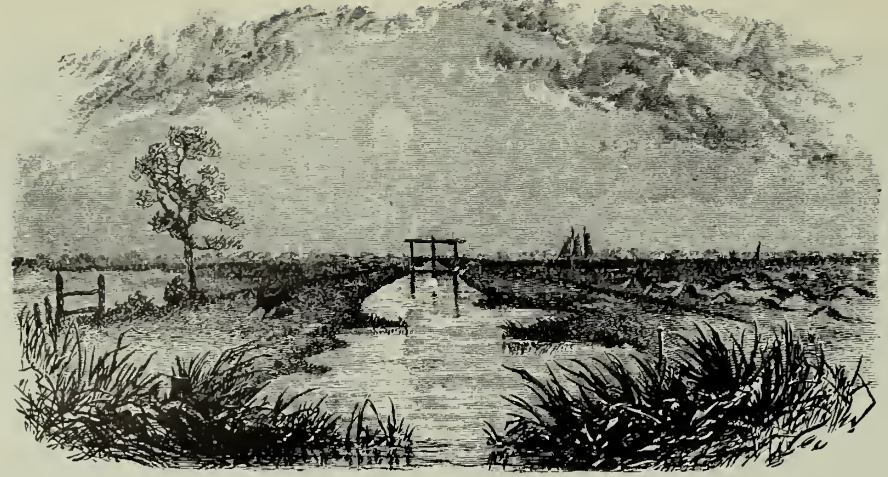
Susan Hood

Rice

& the Culture of Coastal Georgia

by Lucy Justus

Paintings by Alice R. H. Smith
Courtesy Gibbs Art Gallery,
Charleston, South Carolina.
Photos courtesy
Georgia Department of Archives and History,
Vanishing Georgia Collection.



It is 1790 and close of day on the Georgia coast.

The plantation looks like the small, self-sufficient village it is. Along with the manor house, there are barns, stables, smokehouses, chicken houses, a plantation hospital, a commissary, slave cabins, blacksmith, carpenter, cooper's and tanner's shops, cotton gins, and rice and sugar mills.

In the yard, exotic flowers bloom among the magnolias and liveoaks and the orchard includes date palms and orange, lemon and olive trees.

The family and guests have changed to formal clothes, have had drinks in the drawing room and are now assembling in the dining room where the hospitality is superb and the service elegant.

Large numbers of guests are common—neighbors, friends, relatives from the American states, England, Scotland. Many are distinguished: government officials, scientists, teachers, writers, actors and artists.

Because of the variety of food and the numerous visitors to her house, the hostess owns meat platters in at least five sizes and vegetable bowls as big as tureens. On the table, candlelight flickers on fine china, crystal and silver. The menu includes soup, oysters, ham, turkey, beef, vegetables, three desserts and an assortment of wines.

When the last course is finished, the ladies withdraw leaving the gentlemen to cigars, additional wine and men-talk. The women, of course, settle down to their own discussions until the men rejoin them. The evening's conversation may deal with politics, fashion, literature, art, music, a son's progress at a northern university or a European one, the efficiency of a daughter's governess, and a number of other things. But among the men, at least, the talk eventually turns to the current crop of rice.

Rice had done for coastal Georgia what cotton was later to do for inland Georgia. It had paid for the silver, china and crystal, the lavish hospitality, the elegant clothes, the expensive educations for the children, and summer homes on the seashore.

It had, in fact, quickly changed a struggling, rag-tag settlement into a prosperous one. Rice had provided the leisure and financial means through which education, recreation and the cultural arts could develop. It also brought "inequality" to early Georgia, creating a society with distinct levels, and levels within levels.

Under the rule of the Trustees, immigrants who came at the expense of the Trust were allotted only 50 acres of land per family and it was illegal to consolidate the holdings. A few wealthy men were given 500-acre tracts, but in the beginning, the colonists were essentially small farmers on whom an artificial equality was imposed. And slavery was prohibited.

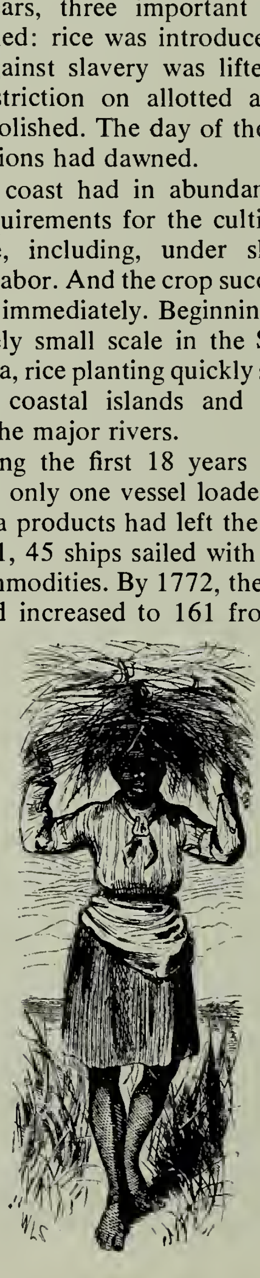
The Trustees had expected silk to be Georgia's money-maker. Great Britain, hoping to free herself of the need to buy silk from other nations, had promoted its production in Georgia. England bought Georgia silk at one shilling, six pence a pound—although the going rate was a shilling or less—and paid preparation and shipping costs. And the Society to Encourage Arts, Manufacture and Commerce offered premiums of three, five and ten pounds to the persons planting and caring for the greatest number of mulberry trees.

But Georgia's climate was ill-suited to silk culture and labor was scarce and unskilled. The colonists had trouble not only in producing silk but in raising adequate food for themselves. They survived mainly on shiploads of imported food. Silk was a loser just as vineyards for the production of wine also proved to be.

Then, at various times within a few years, three important things happened: rice was introduced, the ban against slavery was lifted and the restriction on allotted acreage was abolished. The day of the great plantations had dawned.

The coast had in abundance all the requirements for the cultivation of rice, including, under slavery, ample labor. And the crop succeeded almost immediately. Beginning on a relatively small scale in the Savannah area, rice planting quickly spread to the coastal islands and inland along the major rivers.

During the first 18 years of the colony, only one vessel loaded with Georgia products had left the coast. In 1761, 45 ships sailed with Georgia commodities. By 1772, the number had increased to 161 from Sa-



vannah and 56 from Sunbury. By that year, James Habersham, one of the first major rice planters, had an annual income of about $10,000.

Of the $500,000 worth of products Georgia was exporting annually, many things went to England, including rice, indigo, naval stores and deer skins. Rice, corn, peas, lumber, shingles, cattle, horses, beef and pork were sent to the West Indies. The colonists received wearing apparel, ironware, tea and paper from England; rum and sugar from the West Indies; and flour, crackers and other foodstuffs from the northern colonies.

Slave labor, of course, made the great plantations possible. After the introduction of slavery in 1749, the population increased rapidly and every year the proportion of blacks to whites became larger. By 1772, there were 15,000 Negroes and 18,000 whites.

Estates ranged from a few hundred acres to more than 25,000, divided into several plantations. Some historians say that at no subsequent period in Georgia history did individuals conduct planting on a larger scale than did the rice growers. And agriculture was more diversified before the Revolution than after the rise of cotton.

In coming years, the boll weevil and other pests would arrive to plague planters. Meanwhile, the rice growers had their own specialized problems. One was the rice birds which came in enormous flocks and could quickly destroy a crop. Hurricanes were another major hazard. If, through the effects of a storm, a field were flooded with salt water, several years often had to pass before the field would again produce rice. The life of a major planter was not entirely one of ease. Rice growing was a risky business in which a plantation owner could be bankrupted within a matter of hours.

Obviously only a few original settlers, with only 50 acres, could afford the land and slaves necessary to become large plantation owners. Many who could not, sold their holdings and moved to the frontier where they continued to engage in small-scale farming, grazing and cattle raising. Thus the greatest number of rice plantations consisted of a few hundred acres and a modest frame house. And some of the first settlers became plantation laborers. The levels of society had formed: the elite, the middle class, the laborers and the slaves.

* * *

Midnight in the slave quarters, a group of cabins built along a "street" some distance from the plantation house. A child is sick and feverish. The wife of the plantation owner sits by the bedside bathing the patient's face and administering medicine as the child's mother relaxes nearby.

The child had been born in the plantation "hospital," delivered by the owner's wife and a female slave assigned to care for the sick.

But, previously, when the child's parents had been married, the wedding ceremony did not include the words "til death do us part." Things other than death could separate slave husband and wife. One, or both, might be sold, never seeing other members of the family again. Some ceremonies used "til death or distance do us part."

In the slave quarters, house servants considered themselves elite, a cut above the field hands, but they had much in common, not all of it pleasant.

By law, no slave could leave a plantation, however briefly or whatever the reason, without a written permit from the owner. If caught without a permit, he was likely to be whipped. Willfully destroying a stack of rice, corn or other grain or maliciously setting fire to a tar kiln, barrel of rice, turpentine, tar or resin was punishable by death. The death penalty was also imposed for killing a white person, attempting to raise an insurrection or enticing a fellow slave to run away. Slaves could not carry weapons during the week without the written consent of the owner and under no circumstances between Saturday evening and Monday morning. Anyone who sold alcoholic beverages to a slave was liable to a fine.

It was also illegal to teach slaves to write, but some owners ignored that segment of the law, providing

Painting by Alice R. H. Smith, courtesy Gibbs Art Gallery

simple education as they provided religious instruction, food, clothing and care for the sick.

Parts of the law were designed to protect the slaves. They were legally exempt from working more than 16 hours a day and from any work on Sunday except for domestic service and tasks of absolute necessity. Owners who failed to provide sufficient food and clothing were subject to a fine.

On some plantations, the hours were short, the food plentiful and the relationship between master and slave reminiscent of that between European feudal lords and their retainers. In the 1840s, Sir Charles Lydell, president of the Geological Society of London, was a guest of James Hamilton Couper at Hopeton, a rice plantation with 500 slaves. Sir Charles wrote:

"The children have no regular work until ten or twelve years old when they are set to raking up dead leaves from the paths and sweeping the drives.

"The laborers begin work at six o'clock in the morning, have an hour's rest at nine for breakfast, and many have finished their assigned task by two o'clock, all by three. In summer they go to bed in the middle of the day, then rise to finish their tasks and afterward spend a great part of the night in chatting, merrymaking, preaching and psalm singing.

"Rations allowed the slaves are more than they can eat and they are allowed to return part to the overseer for an allowance of money or keep it to feed their fowls which they sell, as well as the eggs, to buy tobacco and other luxuries. When they get through the day's tasks early they fish and sell their catch. Some employ their spare time making canoes out of large cypress trees, leave being readily granted them to use the trees, as it helps clear the swamps. The canoes are sold for about $4 for their own profit."

However, there were stories, many no doubt true, of overworked and underfed slaves, beatings and other cruelties. Fanny Kemble, a British actress, married rice-planter Pierce Butler who owned Butler's Island. Mrs. Kemble, as she was called, was horrified by slavery and believed, in her words, that slaves suffered agonies worse than those of Dante's "Inferno."

* * *

Early morning. The workers are in the fields and already the sun is hot. In past months, the hands have worked hard at preparing the land for cultivation.

Beginning with a wilderness, they have constructed a levee around some 500 acres, cleared the trees and underbrush, and leveled the land. They have dug a ditch—five feet deep and five feet wide—about 20 feet inside the levee and installed floodgates in the levee.

They have divided the enclosed area into fields of 10 to 20 acres and the fields into one-acre segments, separating each by a ditch four feet deep and four feet wide. Then they have dug quarter-drains, three feet deep and 16 to 24 inches wide, leading into the one-acre segments and installed trunks in the larger ditches to control the flow to individual fields.

During the winter, the slaves have plowed and harrowed the land, cleaned the ditches and laid off the fields in rows or trenches, 13 inches from center to center. In March or April, they had sowed the rice, two-and-a-half to three bushels of seed to the acre. The fields had been inundated and the floating trash raked off and burned. After the seeds had germinated, the fields had been drained and left dry until the rice was about an inch and a half high. Then the fields had been flooded again until the rice was about five inches high and drained again.

It is now time for hoeing—broiling, back-breaking work with a six-inch hoe. The women work alongside the men. In about 12 days, it will be hoed again, flooded again and the trash raked again. After two or three weeks, if grass persists underwater, it may be pulled out by hand. The field will be drained, hoed twice again and reflooded until harvest time when it will be drained and the rice cut with a sickle or rice hook. Then comes threshing, winnowing and milling.

It is grueling, monotonous work and the life of a slave holds little hope of improvement. Like most tasks, chopping and pulling grass from the rice fields seems less dull and difficult when done to the rhythm of music. The slaves provide their own—songs about the plantation, its owners, food, pastimes and, frequently, spirituals of prayer and inspiration:

"Somebody needs you, Lord, kum ba ya, kum ba ya . . . ."

"Swing low, sweet chariot, comin' for to carry me home . . . ."

* * *

Few owners live on their plantations during the summer months when the rice fields are underwater. There is a "miasma" which brings chills, fever and death to white people although apparently the slaves have some immunity. During the dangerous months, the plantation owners move with their families to houses in the cities or on the seashore or sand ridges, leaving the fields to the slaves and overseers, and occasionally paying brief visits when necessary.

But moving does not assure safety. Some years, waves of the "miasma" —later identified as malaria and yellow fever—kill scores of people in Savannah and other areas.

It will be several years before the miasma is properly attributed to the mosquito, but as early as 1802, Joshua White, a Wayne County physician, maintained that a yellow fever epidemic there was related to standing water. He believed the epidemic resulted from the putrefaction of organic debris in ponds.

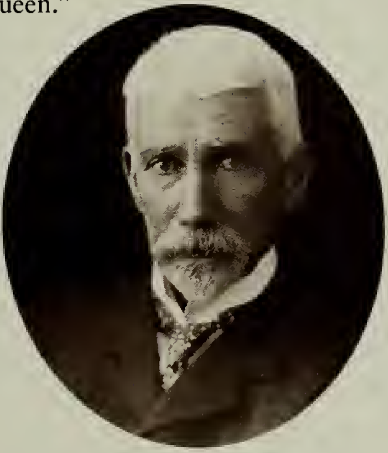
In 1806, White, then practicing in Savannah, read to the Georgia Medical Society a report associating yellow fever with swampy areas and rice fields. As a result, the Medical Society appointed a committee to investigate "the injurious consequences which result to the inhabitants of Savannah from the cultivation of the contiguous low country in rice." The committee reported that yellow fever did not invade the area until the rice fields were created and recommended abandoning rice as a crop.

In 1823, the Georgia Medical Society refused to sanction the wet cultivation of rice, favoring the production of "upland" rice which could be grown without the constant inundation and standing water. In 1829, the legislature passed a law forbidding the wet culture of rice within two miles of Savannah and a city ordinance endorsed the law. Within a short time, Savannah was virtually free of the "miasma" which had haunted the area for years.

Rice growing continued in Georgia for almost 100 years despite the rise of the cotton industry and the major set-back of the Civil War. Rice cultivation in the state died out in the early 1900s, the final blow dealt by growing competition from Texas, Arkansas and Louisiana where rice planters could use heavy machinery unsuitable to Georgia soils.

By then, of course, the era of the great plantations and their way of life had also died.

As somebody aptly observed, "Cotton was king, but first, rice was queen."



James Troup Dent, c. 1914

Hofwyl-Broadfield. One of the early rice plantations along the Altamaha River. The Broughton Island tract was originally granted to General Henry Laurens in 1760 and sold, after his death, to William Brailsford of South Carolina. The plantation acreage grew and shifted and then passed down through a succession of family members including Dr. James Troup, brother of Georgia governor George M. Troup. Two sisters, Misses Miriam and Ophelia Dent, were the last of the line.

When Ophelia Dent died in 1973, the Hofwyl-Broadfield plantation became the property of the state through her will. Miss Dent left more than 1,000 acres to the Nature Conservancy with the stipulation that the Conservancy convey the property to the state or some other agency which would preserve the plantation and perpetuate its historical significance.

Churning Butter, c. 1910

Although the earlier plantation house burned and the boundaries of the property changed through the years, the site now includes the Dent home, believed to have been built as a caretaker's house in 1851, the servants' quarters, the commissary, the ruins of a rice mill and some of the original rice fields and dikes.

Rice was grown at Hofwyl-Broadfield until about 1912 when the plantation became a dairy farm, supplying milk to two counties. The dairy barn and creamery remain at Hofwyl.

Now under development, the plantation will be opened to the general public, probably within the next two years, but it will not be restored as an antebellum rice plantation. It will be preserved as Miss Dent left it in 1973, reflecting the evolution of the plantation from its days of glory through its lean times and its adaptation to a changing world.

Only by adapting did Hofwyl-Broadfield remain alive after many of the other plantations had died. ●

Carrying Rice, c. 1910

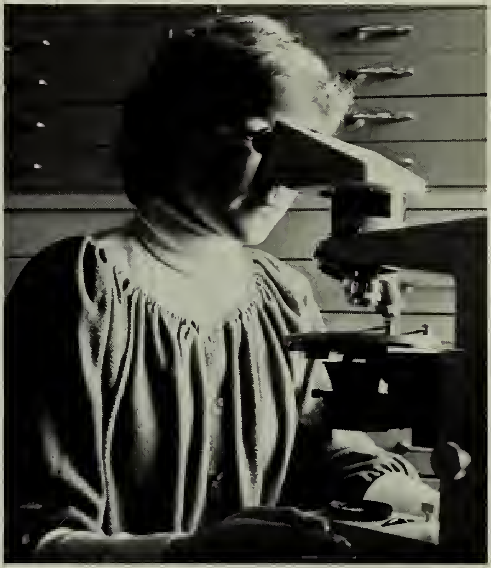
THIN SECTIONS

BY LUCY JUSTUS

If you have ever picked up an ordinary rock and tossed it aside thinking it worthless, you were wrong.

The common rock is one of the most important things on earth and contains some of the world's most striking beauty.

Drab, ordinary, everyday rocks. Some eroded and weathered into soil; some solid, strong, little affected by millions of centuries of wind, rain, heat and cold; some porous, cavernous, nature's storehouses; some broken, faulted, folded by tremendous forces within the earth. These rocks determine where crops grow, where cities are built, where roads run and rivers flow, where groundwater and valuable minerals are found.



Chunks of marble, granite, gneiss, sandstone, limestone, quartzite. As unimpressive as they seem, they are pages from one of nature's most exquisitely written ledgers, revealing to the trained eye much about the history of the earth and its formation. And they contain colors, patterns, textures and symmetry an artist might envy.

The photographs on these pages, which might have been made in a gallery of abstract art, are microscopic views of the everyday rocks found in field, forest, stream, street or yard. The rocks are sliced into transparent slivers called thin sections which are so thin that this type could easily be read through a section of granite. They are only 3/100 mm thick.

The segments of color are mineral crystals which make up the rock, given fire and life by the polarized light of a petrographic microscope. When thin sections are cut precisely to 0.03 mm, each mineral has a predictable variation of color which serves as one key to identification. Mineral colors range from white through various shades of red, blue, yellow, purple, green, gray, black and brown.

Some 1,700 different minerals are recognized. And, although only a comparatively small number are commonly found in rocks, identification is not always easy. Several factors, including relief and cleavage—the directions along which the crystals are split—are helpful in identifying the minerals.

Additionally, under natural conditions, every chemical compound crystallizes in a distinct, recognizable shape, but shape alone does not tell the observer what the mineral is. Frequently after a mineral has crystallized, it reacts with substances in the rock and recrystallizes into an entirely different mineral, retaining its original shape but acquiring a new chemical composition. Such minerals are called pseudomorphs, and while they can be confusing, they tell a great deal about the history of the rock.

Interestingly, precious stones, such as rubies, diamonds and emeralds, yield most of their beauty to the casual glance. In thin section they reveal no blazing colors and few fascinating shapes and textures to intrigue those who search for knowledge or hidden beauty. To the scientist, shapes, colors and textures are invaluable tools of his profession. Consequently, precious gems tell him little he needs to know in his work-a-day effort to understand the world and its resources.

Conversely, thin sections of common rocks are as useful as they are spectacular. In almost any professional task a geologist undertakes, his first step is to learn the composition and history of the rock he is dealing with.

Thin sections tell him the minerals present in the rock, its chemical composition and something of its history—the degree of faulting, folding, recrystallization,

Photos by Sam Pickering

Large Photo: Anthophyllite asbestos
Small Photo: Altered ultramafic

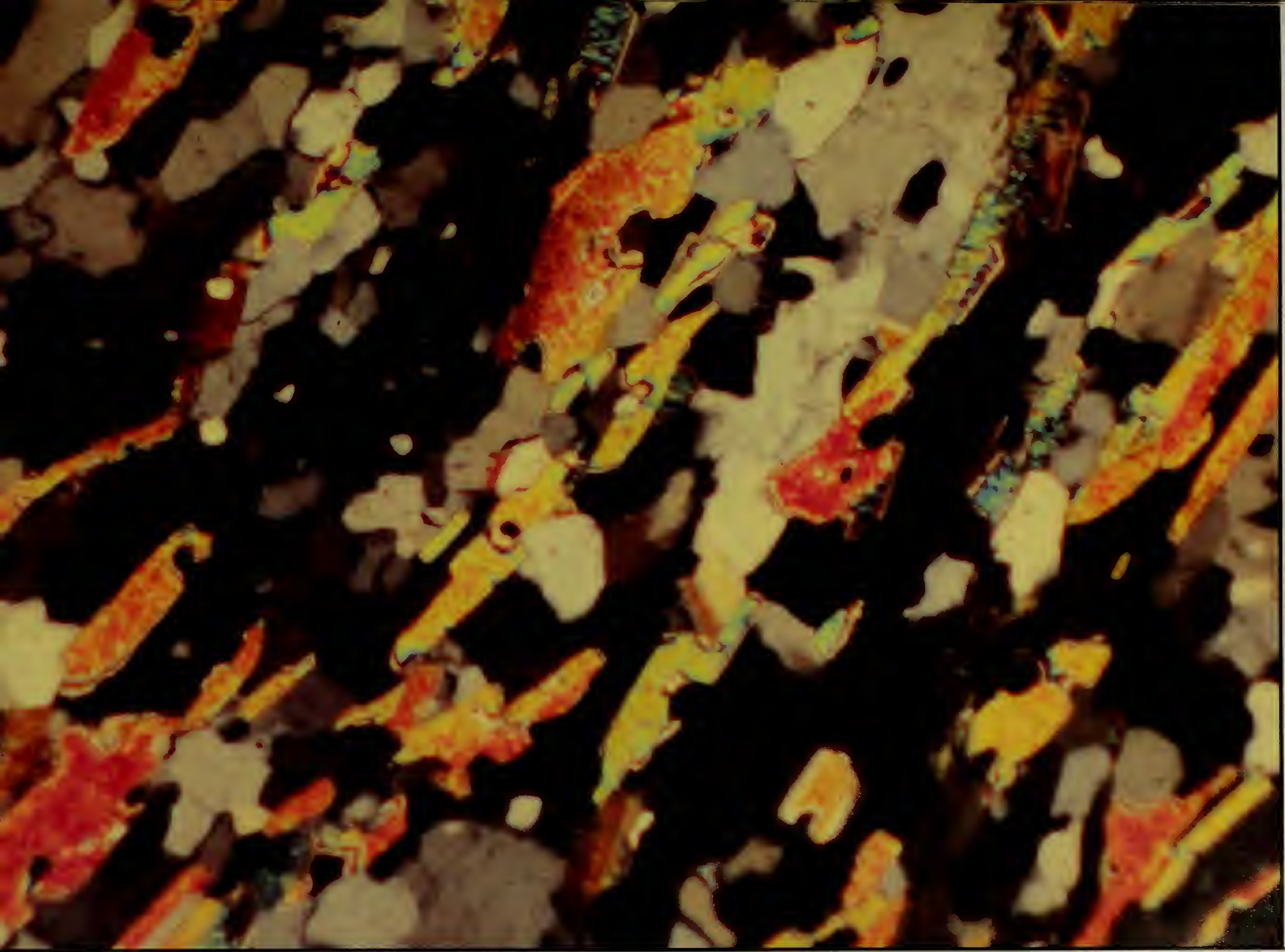


Photo: Biotite gneiss

weathering and alteration it has undergone since its formation. By observing which crystals have pushed others aside, broken or penetrated them, he often learns the order in which the minerals crystallized.

Thin sections help the geologist predict where groundwater, petroleum and valuable minerals may be found. In some cases, they serve as natural maps, indicating where a vein of ore, depleted in one place, may appear in abundance in another.

They can be used to determine whether a rock is suitable as an aggregate in concrete or whether it would react with the concrete, break down and cause structural failure... whether a rock has been so weathered along fractures that it would be unstable as a building foundation... whether a rock has enough pore space to be a good aquifer... whether there are soluble minerals which would degrade groundwater quality... whether the rock is a likely reservoir for petroleum. . . .

The slivers of stone are also the geologist's guide to accuracy when he maps a particular body of rock over tens or hundreds of miles. To assure that he is not tracing a similar but different rock, he collects samples along the way. In thin section, the samples tell him if the rock has the same composition and was formed under the same conditions as the original.

Thousands of thin sections, collected and studied by many geologists, were used in preparing the 1976 geologic map of Georgia, the most accurate and comprehensive of its kind the state has ever produced.

Since no two thin sections are alike, the geologist never knows what he is going to see when he looks at one. He may find waves of rainbow colors etched in the rock hundreds of millions of years ago. There may be mosaics of geometric shapes or impressionistic views of frozen rivers, flaming fountains or showers or meteorites. Such things are clues to the history of the rock.

Perhaps a thin section contains a garnet resembling a pinwheel. The effect would tell the educated observer that the garnet was crystallized while the parent rock underwent slow, very powerful movement causing the garnet to roll like a ball, picking up particles in the process.

Thin sections may contain a variety of clues to a variety of things. Since the same mineral assemblages are often grouped together, the presence of one mineral frequently suggests the presence of another. Olivine, for instance, is commonly found with pyroxene; tourmaline with mica; pyrite with chalcopyrite; and kyanite with saturolite. Asbestos, chromite (the source of chromium) and garnierite (the major ore of nickel) often occur with hornblende, pyroxene and olivine-rich rock.

Other minerals, such as olivine and quartz, almost never appear together.

The type of rock provides only general clues to the minerals it contains. Gold occurs in veins of quartz, uranium in granites and barite in limestone, dolomite or shale. But not all quartz veins are laden with gold, nor granites with uranium, nor limestone with barite.

When valuable minerals are present, microscopic examination of thin sections helps the geologist evaluate the mining potential of the area and the best locations for prospecting. From thin sections, he may discover that ore minerals are implaced along a series of veins or fractures associated with a particular type of fold. That fold, or group of folds, may then become the site of a mining operation.

Although thin sections reveal much about the history of the earth, recording its great upheavals and subtle changes, they do not indicate the age of the rock. Even when a scientist knows the age of crystals within the stone, he may not know the age of the parent, because the crystals may have developed long after the rock was solidified. Studies of individual lead sulfide crystals show that some have grown over a period of 400 million years.

Once the entire surface of the earth was barren rock. Then came the rains, the winds, the blazing heat of the sun, the ice of the glacial ages and the years between, and the rising and falling of the seas. Records of all of that, and more, are inscribed beautifully, scientifically, artistically in the drab little rocks most people never notice. ●

Photo: Muscovite mica in pegmatite

Mistletoe State Park

By Dick Davis
Photos by Bob Busby

No matter what season it is. Mistletoe State Park near Augusta is a good place to visit for a day's outing or a week-long retreat.

A cooling, pleasant breeze wafts in from the lake. A brilliant sun dances on Clark Hill's waters, and you relax at your vantage point, a campsite overlooking the cove. Boating, swimming, fishing, hiking, picnicking or other diversions are at your pleasure.

Or you're sitting restfully on the porch of your air conditioned, fully furnished cottage overlooking the cove at Clark Hill Lake. Months ago you reserved your cottage at Mistletoe State Park and now you're enjoying every minute of your stay.

Or it's wintertime in east Georgia, and a cozy lakeside cottage at Mistletoe Park provides the setting for a cold weather vacation. There are still fishing, hiking and other outdoor activities for the warmer midday hours, and a cheery blaze to make the fireplace the center for the evening's relaxation and fellowship.

Mistletoe State Park—a park for all seasons.

Nestled on the southern shore of Clark Hill Reservoir in eastern Georgia's Columbia County, Mistletoe Park's 1,920 acres provide a variety of outdoor recreation for a vacation of two weeks, a long weekend, or even just a day's outing.

In a setting of picture-book scenery, the park affords access to 78,000-acre Clark Hill Reservoir. You can enjoy a variety of activities in this water playground: swimming, fishing, power boating, sailing and water skiing.

The park derives its name from nearby Mistletoe Junction, for generations an area of profuse mistletoe growth. Strategically located as the park is, on Clark Hill Reservoir and near Augusta, Superintendent David Hansen and his staff each year host a number of visitors who use the park's cottages and other facilities while sightseeing in this area of Georgia or attending the prestigious Masters Golf Tournament.

Check the roster of campers almost any summer weekend at the park and it will include those from various counties in Georgia as well as from out-of-state. There are 107 combination tent and trailer rental sites, most with water and electrical hookup, picnic table and grill. Comfort stations provide hot showers, flush toilets and an automatic laundry. Campsites are rented on a first-come, first-served basis; advance reservations are not accepted.

A unique feature at Mistletoe is a wildlife observation area which has a tower from which wildlife, including deer, can be observed in their natural habitat.

Swimming in the lake water is, of course, popular at Mistletoe. A white sand beach and bathhouse provide needed facilities, and a playground is located nearby.

A delightful nature trail begins at the park office and winds through a variety of forest types, with trees and other flora permanently marked for identification.

A large screened group shelter overlooks the lake and provides excellent facilities which can be rented for large gatherings. The shelter has a barbecue pit, stove, refrigerator, sink, restrooms, and tables and chairs for 160 guests. The shelter must be reserved in advance. Individual picnic sites are available throughout the park.

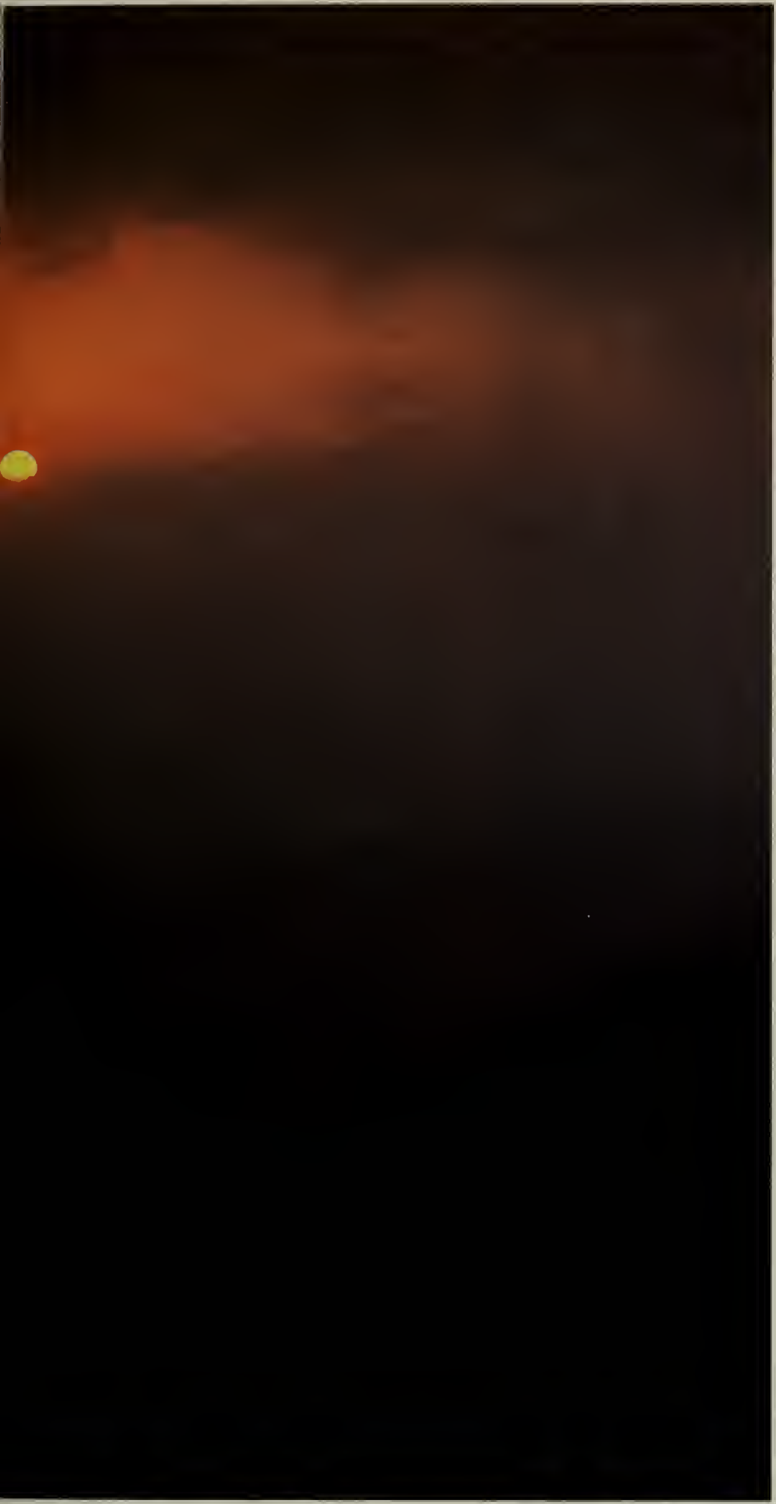
The boat ramp and dock at Mistletoe Park are in almost continual use during favorable weather, as owners bring their crafts to launch for pleasure boating, fishing and skiing.

Organized youth groups utilize the Pioneer Camping Area, which is set apart from other activity areas in the park. The area is available without charge to organizations such as the Boy Scouts and Girl Scouts; prior reservations are necessary.

You can reach Mistletoe State Park from Interstate Highway 20 by taking Exit No. 60 and proceeding 12 miles north.

Mistletoe—a park for all seasons. The water, the woods and fun are waiting. Better try it—whatever time of year. ●

Mountain



Trails

Hiking the Chattahoochee National Forest

By Teresa Moen
Photos by George Owen

Backpacking as a hobby is growing in leaps and bounds. An early proponent of the sport, Bob Marshall, gave an indication as to the reasons why when he said, "For me, and for thousands with similar inclinations, the most important passion of life is the overpowering desire to escape periodically from the clutches of a mechanistic civilization. To us, the enjoyment of solitude, complete independence and the beauty of undefiled panoramas is absolutely essential to happiness."

For people like Marshall (and there are thousands in Georgia if letters to the USFS requesting hiking information are any indication) Chattahoochee National Forest trails offer a world of variety. Here you can find trails suitable for a day's hike, for an overnight or weekend getaway trip, or for the challenge of spending several days alone in a wild setting.

Georgia has a lot to offer a backpacker: a spring, summer and fall of seasonable hiking weather, abundant water supplies in most areas and easy accessibility. Most trails are located less than a day's drive from any point in Georgia,

One particularly well-developed trail system in the Chattahoochee

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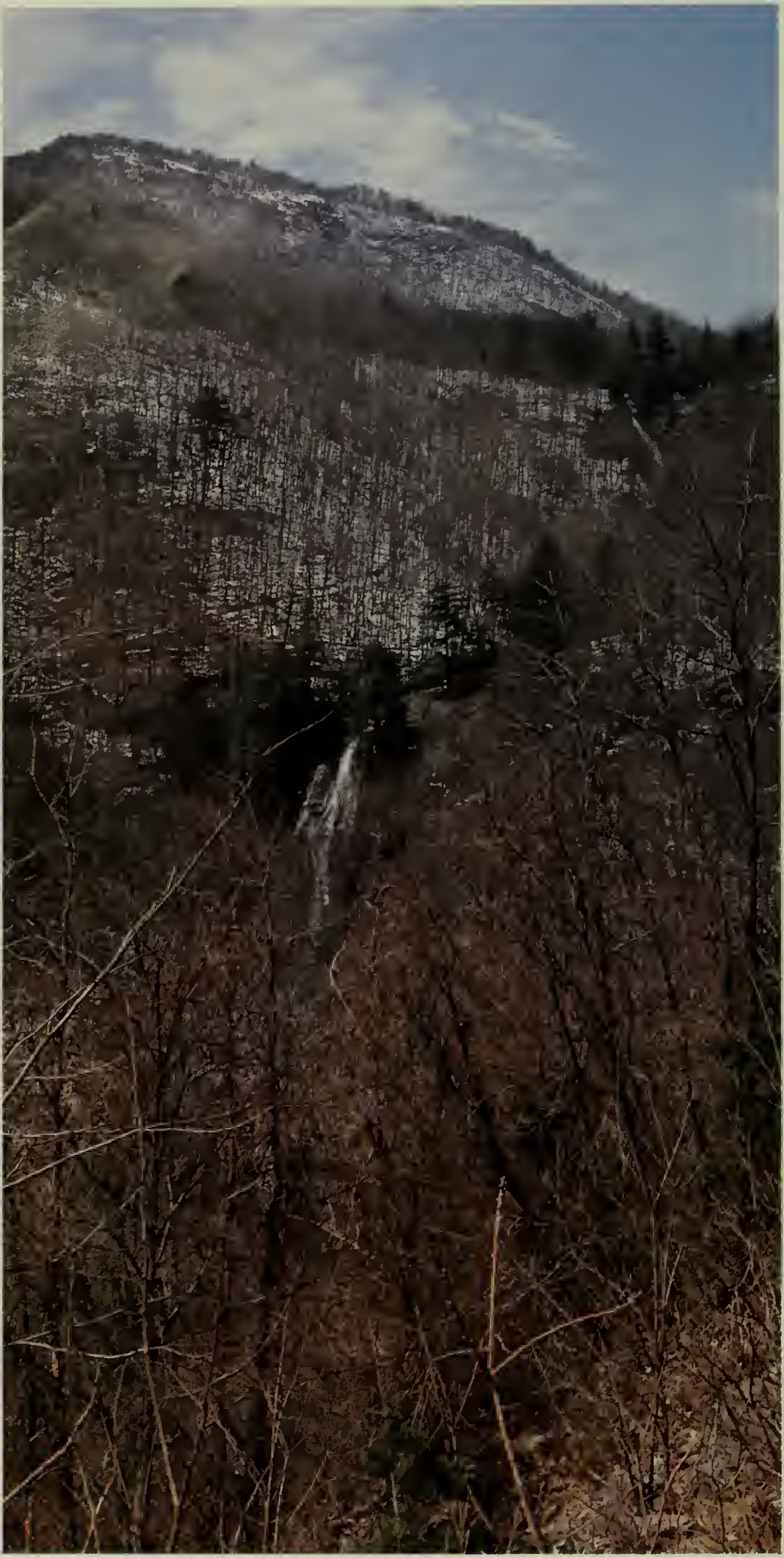
Teresa Moen is an information officer with the U.S. Forest Service, Chattahoochee National Forest, Gainesville. George Owen is a freelance photographer and hiking enthusiast.



National Forest is in the 34,500 acre Cohutta Wilderness in Georgia and Tennessee, the largest national forest wilderness east of the Mississippi River. In the Cohuttas, 18 trails totaling almost 75 miles weave atop ridges, through coves and along streams. Within this area, though, many of the easier or more accessible trails are becoming extremely crowded. If this overuse continues to cause damage to the wilderness, the Forest Service may find it necessary to begin a permit system. Permits would be free but would serve to limit the number of people allowed in certain areas of the wilderness. The Forest Service itself finds this type of regulation distasteful and emphasizes that because of the size of the Cohuttas, such regulation may be unnecessary if usage is spread more evenly.

Some of the trails in the Cohuttas merit special attention because of the nature of the trail or because of safety hazards to hikers or horses. The two river trails, the Jacks River (15 miles) and the Conasauga (5 miles) require frequent fording, so are dangerous during periods of high water or after a heavy rainfall. These two are also among the most heavily traveled. (The Beech Bottoms Trail is probably the most heavily used trail.) Other trails such as Horseshoe Bend Trail or the six-mile Rough Ridge Trail will offer more solitude to hikers. The Tearbritches Trail is aptly named as it descends 1600 feet in its three mile length from the wilderness boundary to the Conasauga River. Rough Ridge Trail and the two mile Hemptop Trail are also characterized by steep grades for long distances.

Horses are permitted on all wilderness trails except on six that offer extreme hazards for the horse's safety. These are the Conasauga River, Rough Ridge, Jacks River, Chestnut Lead, Panther Creek and Sugar Cove trails.

Although wilderness etiquette should be followed on every trail, it is law within the wilderness boundaries. No motorized vehicles or equipment are allowed, nor is cutting of live vegetation allowed. You won't find any developed campsites or fire rings and should leave no traces of your own. Don't carry anything into the wilderness that you can't carry out—no trash cans are provided except at the wilderness trailheads outside the boundary. And please, don't bury garbage; that is no longer an accepted woods practice.

A newly published tear- and water-resistant map of the Cohutta Wilderness is available for fifty cents from the Chattahoochee National Forest, 601 Broad Street, Gainesville 30501, or from the eight district offices of the Chattahoochee and Oconee National Forests. By using this map to carefully plan your hike, you can select a trip of some distance that will bring you back to your starting point without having to arrange for a second vehicle at your exit point. You can also plan a walk through a variety of vegetative zones and landscapes without ever having to retrace your steps.

Two other trails in the Cohutta area of the Chattahoochee National Forest, but outside the actual wilderness boundary, are also worth mentioning. The South Fork Trail is 2.7 miles long following the South Fork of the Jacks River from the Three Forks Road (Georgia 2) north to Elliott Road (FS 126-A). The Jacks River Fields, a popular primitive camping area, is at the lower end of the trail. The five mile Mountaintown Creek Trail follows an old woods road for most of its length. Heading south at Buddy Cove Gap on the Three Forks Road, it meets Crenshaw Branch and follows it to its intersection with Mountaintown Creek and on to Forest Service Road 90. Excellent sites for primitive camping are maintained at each end of the trail.

Don't forget that the entire Chattahoochee National Forest is open for hiking. If you really want to test your outdoor skills, forge your own path through the wilderness and experience the feel of camping in a spot known only to you. Of course, this type of hiking should be attempted only by the knowledgeable who have proper equipment and accurate maps.

(See Guidelines on next page.)

Guidelines
for Hiking and Camping
from the U.S. Forest Service

PERMITS
Permits are not required at present for hiking in the Chattahoochee National Forest. However, a free permit system could be implemented if overcrowded conditions occur in an area. If a permit system is instituted, hikers will be notified by signs at trailheads and other access points.

CAMPING
Camping and hiking are permitted anywhere in the national forests in Georgia except where posted otherwise. No permits or registrations are required at present except in developed recreation areas where fees are charged. All campsites are available on a first come-first served basis.

WINTER HIKING
Winter hiking can be fun but is only for experienced backpackers who keep informed of changing weather conditions and have the proper equipment. Even though the weather may seem quite mild at lower elevations, on the ridges temperatures often plunge below zero when computed with the wind chill index.

CAMPFIRES
A permit is not needed for a campfire. However, if your campfire spreads and develops into a wildfire, you are held liable for the damage it causes. Build your fire away from overhanging branches. Bare the ground to mineral earth and place stones around the fire. When you leave your campsite remove any traces of your presence by scattering the stones and covering ashes. Make sure your campfire is "dead out." Better yet, use a small backpacker's stove to prepare your meals.

HUNTING AND FISHING
Hunting and fishing in the national forests are allowed under state of Georgia regulations. The appropriate permits and licenses should be obtained from the Georgia Department of Natural Resources, Game and Fish Division. Many trails are within Wildfire Management Areas where carrying firearms is prohibited except during hunting season. A check with the Georgia Game and Fish Division on hunting regulations and season dates may relieve an apprehensive hiker. The address is Game and Fish Division, Georgia Department of Natural Resources, 270 Washington St.. SW, Atlanta, GA 30334, Telephone 404/656-3530.

Georgia Place Names

from Ty Ty to Tearbritches Creek

By Paula Putney
Photos by Bill Bryant

A single oak tree at Lone Oak stands as a possible trail marker for travelers to Alabama settlements.

The map of Georgia is dotted with intriguing names of waterways, mountains and towns that pique one's curiosity about the circumstances of their origin. A study of Georgia's placenames takes us back into history to days before the settler, when only Creeks and Cherokees inhabited the territory which was to become the royal colony of Georgia; to the mid 1500s when DeSoto's party traveled north from Florida; to the 1770s when William Bartram traveled the length of the state and recorded his detailed observations; to days when the first surveyors followed a well-traveled network of Indian country trails to map the territory. From these sources and many others we can compile a history of Georgia placenames, of Indians and settlers and events which have left their indelible marks.

Georgia abounds in Indian names which lend a special flavor to any inventory of our placenames. Some names represent Anglicized "tamperings" with the original Cherokee or Creek words, particularly with word endings, because some Indian names were impossible for settlers to pronounce. As a result, many Indian names were subjected to a series of changes which included an eventual change in spelling. Other Indian names have been retained by means of literal translation into their English counterparts. A look at one example illustrates both instances.

The Cherokee Hiwassee, meaning "grassy meadow or canebrake," designates not only a river, but one of Georgia's oldest settlements, as well as a famous Indian trail. The Hiwassee Trail was an important "road" running west from an intersection or fork called the Dividings, located today at Clayton in Rabun County. It was the way over the Blue Ridge to Cherokee in upper Georgia, North Carolina and Tennessee. The settlement of Hiawassee (always spelled with the *a*, unlike the river, trail, gap, etc.) is recorded as early as the journal of DeSoto's travels in 1540. Spellings of Indian names on old charts and maps indicate that originally this name appeared as Iwassee, but it was a common practice to add the voiceless initial *h* to Indian words beginning with vowels. Thus, Georgia placenames such as Hiwassee which still retain this initial *h,* though no longer voiceless, are somewhat unique. The English equivalent of Hiwassee is, of course, savannah, a familiar name applied to a city, a district and a large geographical area where reed cane grew in abundance.

Etowah, a much older Indian name, dates from a settlement in the Etowah Valley between 1000 and 1650 A.D. The English counterpart of Etowah is Hightower, which explains why the Etowah River becomes Hightower Creek in Towns County. Names such as Withlacoochee and Willacoochee (both meaning little big water), Amicalola (tumbling water), Okefenokee (trembling earth), Chattooga, Echeconnee (deer trap), Tobesofkee and Chattahoochee (river of flowered stones) are but a fraction of the list we attribute to Georgia's first settlers.

Indian personal names are also an interesting source of placenames. Indians often utilized insect names as personal names. Thus, Yahoola Creek, meaning doodle bug, got its name from a Cherokee who lived there. Doctortown, one of the few Creek town sites which has retained its original name, stems from a Lower Creek chief named Alleck, meaning "doctor." War titles also served as names for individuals. Four Killer Creek is no doubt so named because the Indian who resided there had killed four warriors. Such names as Six Killer, Whitemankiller and Scalp reflect the days of Cherokee belligerence. Rising Fawn, Young Deer, Drowning Bear and Buzzard Flopper are among many others who have left their imprint, though the record of their deeds is long lost.

Indians also had a tendency to name places for their resources. Ossabaw, one of a half dozen of Georgia's oldest names since it is recorded in DeSoto's journal, is a Guale Indian word meaning "place of holly bushes." The dried leaves of the yupon holly were used for making a famous black drink used on ceremonial occasions. Walnut Creek was originally named, not for an abundance of groves, but for an Indian word, a tongue twister for settlers, which refers to the valuable salt grass which grows there and which the Creeks used medicinally.

Two other intriguing Indian names are Warwoman Creek and Ball Ground. Indian custom included taking one woman along on war parties to do the cooking. Whether the Warwoman appellation stems from a designated social position, or whether one such woman proved herself in battle is pure speculation. The origin of the name Ball Ground, however, is not pure speculation. The Cherokees enjoyed playing a game much like lacrosse, an activity second only to war as a manly occupation. The game included a number of rituals which required, among other things, flat ground next to a stream, since the players had to plunge seven times into a stream before the game began. Thus, both Ball Play Creek and Ball Ground exist as unique Georgia placenames.

When Erskine Caldwell chose Ty Ty as the name for his patriarch in *God's Little Acre,* he was drawing from a word used even in colonial times in Georgia for a kind of stream, swamp, or thicket. The name comes from two members of the *Cyrilla* family, a shrub indigenous to pineland coastal regions which grows as thickets. The name, whether Indian or African in origin, is probably derived from the meaning, "tight eye," designating a thick place that is hard to see through. The name Gardi, a creekswamp near a town by the same name, almost certainly derived its name because people had to guard their eyes from thorny limbs when crossing it.

The roster of Indian placenames is fascinating and lengthy, but our first settlers were not the only colorful influence in naming Georgia's localities. A second influence is found in association with Biblical and foreign names. The early colonists with strong religious tendencies and a familiarity with the "old world" followed a natural inclination in affixing comfortable old names to their new surroundings. Thus, Mars Hill, Plains of Dura, Mt. Tabor, Mt. Zion, Damascus, Ephesus, Corinth, Calvary, Shiloh, Sardis and Smyrna lead an untroubled existence alongside their neighbors. No less out of place are names which evoke associations with family roots or faraway places. Athens, Rome, Cairo and Vienna join a host of towns like Bristol, Dublin, Oxford and Berlin in this category. There are also names which are associated with historical events. Bloody Marsh on St. Simon's Island is so named for the occasion when a band of Oglethorpe's men drove off a Spanish attack. Bloody Branch Creek commemorates the site of the only Indian massacre in Georgia, and Ghost Hole Ford was the scene of a stagecoach holdup in which the driver was shot. Reportedly, it is the ghost of this hapless fellow that haunts the place still.

Several other categories of placenames involve combinations of words such as "beaver." Georgia has about forty waterways with the beaver label: Beaver Creek, Beaver Fork, Beaver Ruin, Beaver Run, Beaverdam and so on. Similarly, there is a large group of names associated with hell or the devil, which seem to reflect the perspectives of the river boatmen who were chiefly responsible for their names: Devil's Half Acre, Devil's Elbow, Little Hell Landing, Hell's Shoals, Devil's Hopper, Devil's Den Creek, Big Hell Sluice, Devil's Trash Pile, and Devil's Drag Out, to name a few. Another interesting group is referred to as the "Poor Robin Places." Three streams designated as Tobler Creeks, which run east and west of each other, were linked by an Indian Trail

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called Toms Path, which connected with a fourth stream now known as Jobleys Creek. Early records suggest that William Tobler, who was the chief resident there, was engaged in illicit liquor traffic. Although the origin of the name has been lost, all of the Poor Robin localities occur along a common line across the state where possible clandestine crossings are plentiful.

Less interesting placenames are those associated with economic activity and names which are railroad designations. This group includes Lumber City, Pecan City, Rockmart, Cement, Cedartown, Cotton, Iron City, Mineral Bluff, Orchard Hill, Radium Springs and Walnut Grove. Railroad names such as Cenchat, Elko, Arco and Arcola are even more prosaic.

Fortunately, however, a look at Georgia's placenames from a geographical or topographical standpoint sends us back to our more imaginative settlers. Spoil Cane Creek, which coincided with the Unicoi Road, lies in an area which was heavily traveled. Access to cane for grazing was important to early travelers. One surveyor indicated the name as "Spoil'd Cane," suggesting that the area had been overgrazed and the name thus served as a warning that travelers should not expect too much. Pine Log Creek and Pine Log Town, an important Cherokee settlement, are actually translated Indian expressions which mean "pine footlog place." Simply, the name describes a crossing on a creek. Stumps and logs were often used as markers on wilderness trails, and many old maps indicate spots such as Chopped Oak, Skinned Chestnut and Burnt Hickory. Likewise, names such as Rocky Creek, Rocky Face and Pine Mountain explain themselves.

Perhaps the most interesting group is one we call the "Poor Mouthing" placenames. In these names we can clearly appreciate the flavor of backwoods figures of speech. A large number of streams obviously required hard work and some risk to cross. The names themselves are generally very old and appear on some of the first maps and plats. Such locations are Bad and Worse Creeks, Troublesome and Trouble Creeks, Tearbritches Creek, Rough Creek, The Bad Prong of Ten-Mile Creek, Hardscrabble Road, Pulltight Hollow, Lickskillet, No Man's Friend Pond, Lordamercy Cove, Hardship Creek, and Useless Bay get down to the hard facts and mince no words. Similarly, there are a large group of "hungry" names. "Blue John," a pioneer expression for skimmed milk, turns up as Blue John Creek. There is both Buttermilk Sound and Shoals. A further look turns up Poor Joe Branch, Cracker's Neck, Scrougetown, Scuffletown, Mangy Branch, Needy Creek, Big and Little Scarce Corn Creeks, and Hard Labor Creek, actually an Indian name. To this interesting catalogue we can add Flint Hill, Rye Patch, Briar Patch, Frog Pond, Dog Fennell and Pebble Hill. Admittedly, names like Dismal Knob, Dismal Gap and Dismal Cove are not likely to attract many newcomers.

The opposite side of the coin is found in names which express pure optimism, since not all settlers were pessimists. The list of cheerful locations is as long as those which bemoan and disparage. Sweet Home, A-1, Ideal, New Hope, Prosperity, Cornucopia, Magnet, Eureka, Excelsior, Zenith, Fancy Hill and Paradise represent a sample of happier locations.

A total of 37 Georgia counties bear the names of the state's chief executives, from Oglethorpe to the more recent Harris and Walker. At least an additional 20 counties bear the names of famous American patriots, presidents and heroes of the Confederacy. But the odd assortment of instances in which there are both towns and counties by the same name, but in which these towns are not located in the counties bearing their names, can boggle the mind. For instance, Towns is in Telfair County, Monroe in Walton County and Forsyth in Monroe County, while Macon is in Bibb County and Oglethorpe is in Macon County. Then we have Bartow in Jefferson County, Decatur in DeKalb County and Washington in Wilkes County, while Jefferson is in Jackson County and Jackson is in Butts County. The list is endless.

Curiously enough, once a geographical location acquires a name, it takes on a kind of immortality. The spelling and even the pronunciation may change over a period of years, but seldom the name itself. A need for making changes occurs in only a minute percentage of placenames. Early settlers faced with the Indian name Thlathlothlakuphka, or Rotten Fish River, wisely adopted the Spanish alternate, Santa Maria, which later became St. Mary's. In the instance of personal placenames, however, it is possible for the individual to fall from grace, as in the case of John Randolph, for whom Randolph County was named. In 1812 the name was changed to Jasper County because the citizens disagreed with Randolph's policies. However, the name was later restored when the incident was forgotten and the name Jasper was given to another county. In the case of a community called Hard Money, the citizens switched to Weston as being a name with fewer disparaging connotations. In some instances, names have undergone change by shortening the original. Okeewalkee has become "Walkee," natives generally refer to the Ohoopee as the "Hoopee," and the Ichawaynochaway is commonly referred to as the "Nochaway." These abbreviations immediately label the "outsider" who uses the longer form.

A creek now known as Stocking Branch was originally Stalkinghead, from a practice common to hunters who camouflaged themselves while stalking their prey. The original name lost its meaning for later inhabitants of the area. Only the names of two Georgia towns have suffered real change: Harmony Grove has become Commerce and Jug Tavern is now Winder. But of the few communities whose names have undergone change, Atlanta holds a record of sorts. Today's Atlanta was first known colloquially as Terminus, then Marthasville and finally, in 1845, as Atlanta. ●

This article is based on **The Essays of John Goff** as reprinted in **Placenames of Georgia**, edited by Utley and Hemperley.

OPOSSUM

By Robert W. Herres
Art by Linda Howard

Seemingly frozen by the headlights of an advancing automobile, the opossum you see at night is a mammal virtually unchanged from prehistoric times. A lowly 'possum probably hid from dinosaurs long before rain was predicted at Noah's place.

The opossum is the only marsupial in North America. Marsupials (mammals with pouches) were once the most numerous mammals but now are located only in Australia and South America with but one species, *Didelphis virginiana*, being found in North America. In Australia the kangaroo, koala bear and wombat are some of the better known marsupials. In South America a diverse variety of opossums live.

Roughly the size of a house cat, the Virginia or common opossum is ratlike in appearance. While sometimes appearing as practically white, his color often varies. A black-tipped underfur shows through and gives the animal an unkempt appearance. He often looks as though he needs a good course in personal grooming.

His head and cheeks are whitish and his ears are black with white tips. The prehensile tail is long and hairless. Like all animals with prehensile tales the opossum finds many uses for his tail. He can carry objects with his tail, and it also aids in supporting his weight if he fears being shaken out of a tree. The tail is often dark at the roots and whiter toward the tip.

The opossum has short legs and doesn't run very fast—he sort of waddles. His tracks are sharply defined as opposing thumb-like toes on his hind feet make them look like little handprints.

A shy, furtive animal who typically does not fight, an opossum makes a hissing sound. He has 50 teeth (more than any other mammal in Georgia) but is not aggressive so he "plays 'possum."

The opossum, when threatened, can't run, doesn't fight and so his method of survival is to play dead. He shuts his eyes, his tongue hangs out of his mouth and he remains motionless. He can be poked at or turned over but will not give away his act.

Scientists have long debated whether when the animal is feigning death he is just faking or if fright has produced a catatonic trance. In 1968 an electroencephalograph (EEG) was connected to an animal. The brain wave tracings during the trance-like period were substantially the same as those recorded when the animal was awake and alert. From this evidence the California biologists concluded that the opossum is shamming. Other scientists are still not convinced.

An opossum is most active at night and won't be seen during the day unless his burrow has been disturbed. Besides being nocturnal he is arboreal but can often be seen quite a distance from trees.

Hibernating is not the nature of this animal, but he will remain in a nest during the worst of a winter storm. Hunger sends him in search of food. His tail and ears are subject to frostbite and he may lose a portion of them during extremely frigid weather.

A scavenger, his diet consists of practically everything. He eats both animal and vegetable food and seems to be especially fond of berries.

The opossum ranges over all of the eastern half of the United States and is also found along the Pacific coast. He seems to be extending his range northward.

In Georgia he is found statewide. The Virginia opossum is seen in the mountains and Piedmont areas, and a slightly smaller and darker type is found on the coastal plain. The smaller opossum ranges on down through Florida.

The opossum stays within a 40 acre area. He lives in the country, the suburbs and in city areas.

The opossum nests in swamps, fields or open woods with water nearby. He lives in hollow trees and will burrow in the ground.

In Georgia there are two breeding periods—one from January to March and the other from April to June. Farther north only one litter a year is born.

The female opossum has the shortest gestation period (12 to 13 days) of any North American mammal. When the young are born, the mother wets down a path to the marsupian (pouch) with her tongue. Newborn too weak or too poorly developed to make the trip will perish. They are really little more than embryos, being naked, blind and deaf at birth. It will be about 60 days before their eyes open.

In the pouch they attach themselves to a teat and stay put. Since mother is engineered with 13 feeding stations, all above that number die. With litter size being from 6 to 18, those born late have a slim chance for survival.

In two months the young start to leave the pouch. They hitch a ride on mother's body but return to the pouch to feed or for safety. Three months after birth the litter starts to scatter and the young are fully mature in a year.

Predators take their toll but the greatest enemy is man. Opossums are taken for food, which is somewhat like pork, or fur which is usable but not of top quality.

The most significant fact about this relatively harmless animal is its ability to exist with little change. No beauty contest winner, the opossum is as interesting as any of God's creatures. ●

Robert Herres is an associate professor at West Chester State College in Pennsylvania as well as a freelance writer.

Painting courtesy Mrs. Neal Irby, Atlanta.

focus:

Georgia's Protected Species

Eastern Brown Pelican

By Mary Anne Neville-Young
Biologist, Game and Fish Division

Soaring only inches above the water, brown pelicans appear as primitive as Pterodactyls. These fascinating birds are an integral part of the beach and harbor scenery along Georgia's coast. Although Georgians may take this species for granted, the eastern brown pelican is struggling for survival in much of its former range. Original populations have been totally eliminated from the Gulf states where, ironically, the brown pelican is the state bird of Louisiana. The saga of the brown pelican has become a classic. It demonstrates how a wildlife species can be a barometer of environmental conditions.

The eastern brown pelican is scientifically known as *Pelecanus occidentalis carolinensis.* It is a native of marine environments, though seldom venturing far out to sea. The eastern brown pelican is migratory and is found as far south as the coasts of Colombia and Venezuela. This species is one of eight species of pelican found in the world. Two of them are found in the United States, the brown pelican and its larger, more western relative, the white pelican.

Pelicans are an unusual family of birds. Their most characteristic trait is their pouch composed of skin and located under the bill, the pouch serving as a container for the bird's catches. All species of pelican have webbed feet, making them proficient swimmers, but the eastern brown pelican is the only species with the interesting habit of diving directly into the water after its catch.

Adult pelicans are brown with white on the head and neck; pouches of the adults are dark grey. The bill is yellow with a red tip. Pelicans average 4,000 grams (8.8 pounds) in weight and exhibit a formidable wingspan of 2 meters (6.2 feet). In mature birds, sexes are alike; however young birds can be distinguished from adults by a more uniform brown color. Young pelicans are also more vocal than adults, emitting characteristic squealing and grunting noises. Pelicans do not breed until three years of age. Mating occurs on offshore islands from late winter to late summer. The nest usually consists of three eggs.

The historic breeding range of the brown pelican has been greatly reduced. Breeding populations are presently found along the Atlantic Coast from North Carolina to Florida. (Georgia has no present-day reports of nest sites, however.) The species' former breeding range included eastern Mexico, Texas, Louisiana and Florida extending up through the coasts of the Carolinas. Texas has a remnant population at present, but the state of Louisiana has lost its original breeding population entirely. Most pelican populations are considered unstable, with the exception of those in Florida. There, its population appears to number over 20,000. To assess the species numbers in Georgia, aerial surveys are conducted on the coast in the winter and summer by the Dept. of Natural Resources, Game and Fish Division.

The decline of the brown pelican was first noted in the1930s in Louisiana. It was recognized that food shortages or lack of proper nesting sites alone could not account for the diminishing population. Other severe population declines and reproductive failures were reported from other parts of the country following Louisiana's observations.

What has pushed the brown pelican so close to extinction? As is the case with most endangered species, several factors are at work. However a main culprit was identified in the near demise of the pelican: DDT.

DDT belongs to a group of chemicals known as chlorinated hydrocarbons. These compounds have primarily been used to control insect pests. Since DDT was inexpensive and did not decompose, many applications were unnecessary, making the chemical highly desirable. Un-

fortunately it was this very character of non-biodegradability which accounted for the havoc DDT and similar compounds brought to the environment.

DDT metabolizes into DDE; this, like other chlorinated hydrocarbons, stays in biological systems by storing in fatty tissues. As predators consume prey, the amount of DDE increases by a process known as biological amplification, until species at the top of the food pyramid receive the largest doses. Since the brown pelican is a fish-eater, it is at the top of the food chain.

The most obvious effects of chronic pesticide poisoning seen is lack of nesting success. The pesticides interfere with calcium metabolism, and eggs are laid with soft, or malformed shells, making them subject to breakage and predation.

Top carnivores, like the brown pelican, represent non-target species which suffer from accumulations of pesticides contaminating estuarine and oceanic systems. High levels of these persistent compounds exist especially in the Gulf states. Residues from direct application in these areas are augmented by those received via the Mississippi from the Midwest. This concentration of pesticides accounts for the near demise of the pelican in Texas in the 1950s and '60s and its virtual extirpation from Louisiana.

The brown pelican is classified as an endangered species in both the Federal Endangered Species List and the state of Georgia's Protected Species List. For each species of wildlife listed as federally endangered, the U.S. Fish and Wildlife Service appoints a recovery team. This group assists the Service in planning recovery efforts for the species. The plan for the eastern brown pelican is presently directed at preventing the extirpation of the bird in any significant portion of its historic range. To accomplish this, the historic range needs to be identified, as do ideal nesting locations. Restocking pelicans in areas within their historic range has already been attempted.

During the period 1968 to 1970, Florida pelicans were reintroduced into Louisiana. The birds suffered about 40 percent losses. These were due to the heavy pesticide contaminations in the Gulf. Obviously, for any recovery involving transplants to work, levels of DDT and DDE would need to be carefully monitored. California has successfully stabilized its pelican populations by lowering pesticide levels. The recovery team recognizes other limiting factors in the pelican's population declines. These include the general lowering of water quality which results in reduced visibility of prey species, oil spills, vandalism and unnatural predations such as those by dogs or accidents from fishing lines. To successfully stabilize eastern and Gulf populations, all the limiting factors will have to be dealt with. But the effect of pesticides on the species is the factor that man needs to deal with intimately.

Being a non-target species like the brown pelican, man often does not recognize danger unless confronted with it in a dramatic form. Environmental contaminants may work in subtle ways; when wildlife species suffer the consequences of these stresses, they are sounding alerts that should be heeded. Efforts going into the recovery of the brown pelican will serve to improve our own quality of life. ●

focus:

Georgia's Protected Species

Shortia

By Steve Bowling
Botanist, Game and Fish Division

Shortia, one of the most attractive of Georgia's protected plants, has perhaps the most interesting history of any of them. For nearly 90 years from its discovery in the late 1700s until it was rediscovered in the late 1800s, shortia was "lost." The story of how it was found again is one of the most famous in the history of botany.

Shortia or something very similar to present-day shortia was in existence perhaps 35 million years ago. At that time the climate was warmer and the species grew in Asia and North America as far north as the Bering Strait between Alaska and Siberia. During the period of the Ice Age between 600,000 and 12,000 years ago, shortia was forced south by the advancing ice sheet. Today it survives as a single species in a restricted area of the southern Appalachian mountains and as about ten species in Japan, China and Taiwan.

Shortia was first discovered on December 8, 1788 by André Michaux. Michaux was a French botanist employed by King Louis XVI to explore the American wilderness for plants which would be suitable to grace the gardens of Europe. Michaux had been in America for three years when he made a trip to look for the headwaters of the Savannah River. He followed one of its northeastern tributaries, the Keowee River, into South Carolina. He was nearly to its source when he found shortia. The plant was totally new to him, and he made no attempt to name it or adequately describe it. Instead he wrote in his journal that he had found "a new little shrub." Botanists describe anything woody and smaller than a tree as a "shrub." However, shortia is not woody and certainly does not resemble a shrub in the usual sense. Michaux's mistake of calling it a shrub would later create confusion in the search to find it. One thing he did, however, which was unusual for Michaux, was to give a very exact description of where he found his "new little shrub." Then Michaux left the banks of the Keowee, and shortia was not to be seen until 90 years later.

In 1839 Asa Gray, an American botanist, was in Paris to examine the pressed specimens of plants that Michaux had brought back from America. He came across the specimen of shortia that Michaux had collected 50 years before and recognized it as a totally new genus and species of plant. He named it *Shortia galacifolia, Shortia* for a prominent Kentucky botanist, Dr. Charles Short, and *galacifolia* which means "with leaves of galax."

The label on the pressed specimen that Gray saw said that it had been collected in the "high mountains of Carolina." This mistake, coupled with the one in Michaux's journal calling shortia a shrub, caused the greatest of problems in finding the plant again. Though Gray had read Michaux's journal, he made no connection between the journal's "new little shrub" with the exact location described and the pressed specimen with its misleading "high mountains of Carolina."

Gray and other botanists searched for shortia for nearly 40 years. They always looked for it on the highest mountains of North Carolina—Grandfather, Roan, Mt. Mitchell and others. Though they discovered several species of plants new to science on these trips, the shortia which Gray most hoped to find eluded them.

In the spring of 1877 shortia was rediscovered along the banks of the Catawba River by George Hyams, the 17-year-old son of a Statesville, North Carolina commercial plant collector. When Gray learned of this, he and others set off on another expedition into the high mountains at the source of the Catawba thinking that must be where Michaux found it. Again they met with failure.

Another botanist, Charles Sargent, who had been on this last expedition with Gray, read Michaux's journal in order to find the spot where he had found a tree known as Fraser's or mountain magnolia *(Magnolia fraseri)*. Michaux mentioned finding this magnolia near where he

found his "new little shrub." Still not making the connection, Sargent made a trip in September of 1886 to find the magnolia. By following the journal's detailed instructions, he came back to the exact spot where Michaux had been. Here, 98 years later, Sargent found shortia exactly where Michaux had first seen it.

Shortia *(Shortia galacifolia),* also known as oconee bells, is a beautiful little plant with shining, leathery, evergreen leaves that are nearly round or slightly oblong and usually about 1½ inches across. It blooms in March and April with bell-shaped flowers that are about an inch long and across and composed of five petals with scalloped edges. White is the usual color of the petals although they are sometimes tinged with pink. The plant grows as a groundcover forming low patches (4 to 6 inches high) that may cover a fairly extensive area. Shortia grows in rich mountain woods along stream banks and in ravines usually under rhododendron and mountain laurel.

A common, very similar and closely related plant, galax *(Galax aphylla),* also known as coltsfoot or beetleweed, grows in similar habitat as shortia and is easily confused with it. It, too, has shining, leathery, evergreen leaves that are usually round but are almost always larger (2 to 4 inches across). The leaf stalk of galax is round and wiry and attached to the leaf in a distinct slit or indentation into the side. Shortia's leaf stalk is slightly flattened and grooved and attached near the edge of the leaf. Galax blooms later (May to July) and has many small (¼ inch across) white flowers forming a spike on a single stalk about a foot high.

Shortia grows in only nine counties in the mountains of North Carolina, South Carolina and Georgia. Though sometimes very abundant where found, it is rare and local in its distribution. In Georgia it has been found only in one place in Rabun County. At this location there are two small patches which, if combined, would occupy about a six foot square area. It is due to this rareness and certain other threats that shortia has been listed as endangered by the state of Georgia and has been proposed for endangered status under federal law. The greatest threats come from the damming of mounting rivers and the collection by commercial nurserymen and amateur gardeners. Though there are areas where shortia still occurs, the spot where Michaux first found it over 190 years ago is now under the waters of Lake Jocassee in South Carolina. ●

Rob Jacobs

Outdoors in Touch

edited by Susan K. Wood

NEW BOARD MEMBERS NAMED

Marvin Billups, Jr., Linda Billingsley, J. Leonard Eubanks and James H. (Herb) Butler have been appointed by Governor George Busbee to the Board of Natural Resources which sets policy for the Department of Natural Resources.

Billups, deputy director of the City of Atlanta's Bureau of Parks and Recreation, is the first black to serve on the Board. A former teacher and coach in Madison County, he has a degree in Health and Physical Education from Albany State College. Billups represents the Sixth District, succeeding James Mankin.

Linda Billingsley, appointed to the Fourth District seat, has long been active in environmental conservation. She has been a member of the Georgia Heritage Trust Commission and the U.S. Environmental Protection Agency Region IV Advisory Committee. She has also been active in efforts to preserve Soapstone Ridge in DeKalb County (See *OIG,* January 1977.) The DeKalb resident has been associated with the Georgia Conservancy, the Nature Conservancy, Atlanta Landmarks and several other conservation/preservation groups. She replaces George Dillard.

Eubanks, a lifelong resident of Mitchell County, is president and executive officer of the J. L. Eubanks Pulpwood Company. He has been a registered forester since 1951 and is a director of the Georgia Forestry Association. He is also actively involved in extensive farming interests. A resident of Pelham, Eubanks represents the Second District. He succeeds Leo T. Barber who served for eight years.

Herb Butler, named to an at-large position, is a resident of Cobb County. He is a charter member of Local 10 of the United Auto Workers, having joined in February 1948. He served in various offices of Local 10 until October 1957 when he was appointed to the UAW Region Eight staff and assigned to the Georgia area. He was appointed area director of UAW in 1971. He replaces Jim Cone.

In making the appointments, Governor Busbee commented, "The outstanding and varied credentials and backgrounds of these new appointees will bring additional strength to the Board of Natural Resources, and I am pleased that these individuals have made the necessary commitment of their time and talents to fill these important positions."

WHAT'S HAPPENING IN GEORGIA'S PARK SYSTEM

Fourth Annual Fireside Craft/Art Show
Unicoi State Park
February 17-18

The Fourth Annual Fireside Craft/Art Show will be at the Lodge and Conference Center between 10:00 a.m. and 6:00 p.m. both days. Many of the Southeast's finest craftspersons will be exhibiting and selling their work at the show. Overnight accommodations are available at Unicoi and in the nearby town of Helen. (404) 878-2201.

Turkey Hunting Workshop
Unicoi State Park
March 2-3

All turkey hunters are invited to get ready for this year's gobbler hunts by attending this special workshop. Experts will be on hand to teach and discuss hunting skills, techniques, equipment, as well as turkey management programs. Helen (404) 878-2201.

Indian Artifacts Identification Days
Etowah Mounds Historic Site
March 24-25

A professional archaeologist will be at the site to identify and give information on your artifacts. Cartersville (404) 382-2704.

Spring Orienteering
F. D. Roosevelt State Park
March 24-25

Classes for beginners will prepare participants for successful running of any of the three beginner orienteering courses to be set up. Courses for intermediate level will be held also. Pre-registration $1.00. Pine Mountain (404) 565-7092.

A NEW BOOK—GROUND WATER RESOURCES OF GEORGIA

Activities of the two state agencies holding primary responsibility for Georgia's ground water use are discussed in a new book from the Institute of Government, University of Georgia.

Ground Water Resources of Georgia is written by Dr. James E. Kundell, Institute science and technology specialist.

The book reviews the work of the Geologic and Water Resources Division (now Georgia Geological Survey) of the Department of Natural Resources in researching the ground water system in the state. It also discusses the role of the Environmental Protection Division of the DNR, the regulatory agency charged with protecting the water resource.

Dr. Delmer D. Dunn, Institute director, notes that "The book presents a complete discussion of the state's water concerns." It explains what the ground water resources of Georgia are—including twenty-one maps and illustrations outlining the locations and sizes of all Georgia's aquifers.

The problems that threaten Georgia's ground water resource are examined in detail. They include both natural and man-made contamination sources. The book also points out that reduced water quality already affects some areas of the state and discusses the specific problems of those areas.

Ground Water Resources of Georgia reviews all the state laws concerning water. It discusses, in lay terms, laws including those that regulate the drilling of wells, require permits for pollution discharges, and administer a permit system for use of ground water in excess of 100,000 gallons per day. The complete texts of major water laws are included.

Copies of *Ground Water Resources of Georgia*, 150 pages, are available for $6.00 each from the Publications Program, Institute of Government, University of Georgia, Terrell Hall, Athens 30602.

REWARD FOR BANDED GROUSE

A $5.00 reward is being offered for certain ruffed grouse in north Georgia by scientists from the University of Georgia.

Last spring and summer, a number of young grouse were banded in the web of their left wing in an effort to learn more about chick survival, movement, habitat utilization and age of these birds.

Any hunter taking grouse should examine the left wing for an aluminum band and claim his reward by sending in the band, tail and both wings with the feathers intact, along with his name, address, date and location of the kill.

The material may be sent to The Institute of Natural Resources, University of Georgia, Athens, Georgia 30602, phone (404) 542-1555, or taken to any Game Management Office of the Department of Natural Resources where the biologists will deliver the material to the university.

The reward will be sent upon verification of the band.

NEW RATES IN STATE PARKS

The rising operational costs of utilities, supplies, repairs, equipment and labor have brought about an increase in some fees charged in Georgia's state parks.

New rates, as outlined below, became effective January 1, although reservations made before November 1, 1978 at old rates will be honored. As Henry Struble, director of the Parks, Recreation and Historic Sites Division, explained, "The goal of this division is to provide camping, cottages, swimming, group shelters and all of our facilities at the least possible cost to our visitors. The cost of operating and maintaining these facilities has simply exceeded the rate we were charging for their use."

The 11-month advance reservation policy for cottages, mobile homes and group shelters will remain the same. Reservations can be made at the individual parks. The priority for accepting reservations is: reservations made in person at the park site, those made by telephone and those made by letter. The maximum number of cottages that may be reserved by one person for one period of time is two cottages. Tent and recreational vehicle campsites will continue to be available on a first come, first served basis.

For more information, contact the Parks, Recreation and Historic Sites Division at (404) 656-2770.

Facility	**Current Rate**
Cottages	
1 Bedroom	$ 18.00
Mobile Home	20.00
2 Bedroom	24.00
3 Bedroom	30.00
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Volume 9 March 1979 Number 3

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FRONT COVER: "The Challenge" by Dr. Allen Hughes. Courtesy, Swan Graphics, Ltd., 4220 Dayton Blvd., Suite N, Chattanooga, Tennessee 37415.

BACK COVER: The end of the fisherman's day near Savannah. Photo by Chris Miller.

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Don't Cheat Yourself

In a few short weeks Georgia's growing army of turkey hunters will invade the forest prepared to match wits and woodscraft with the only bird honored with big game status. Some will be successful, but most will not, since bagging a mature turkey gobbler is considered one of the toughest hunting challenges in eastern America.

Getting a turkey today is a good bit easier than it was ten years ago, though. This is true because there are more turkeys available in more places than there used to be. An aggressive wild turkey restoration effort by the Game and Fish Division (see page nine this issue) and a favorable climate for the past few summers have greatly increased the huntable populations of turkeys statewide.

At the same time, the sophistication of the turkey hunter has kept pace with the increasing hunting opportunities. The carefully guarded "secrets" of the old timers are now known to all serious hunters. Turkey hunters even have their own national organization (see page 12 this issue) through which to communicate with each other and with wildlife conservation agencies on behalf of their namesake bird.

Nevertheless, bagging your turkey is still not easy. And that's as it should be, because this helps preserve the high value of hunting this magnificent game bird. Unfortunately the high value of the turkey also tempts an unscrupulous few to try to acquire a turkey, any turkey, by any means for the status involved. It is hoped that the growing awareness of sportsmen and the efforts of our conservation rangers will help discourage blatantly illegal hunting methods, such as baiting.

Even the average conscientious hunter can foul up through carelessness. In the adrenaline high of an about-to-be-successful turkey hunt, it is easy to take a quick shot at a large black "gobbler" only to find the corpse of a hen when the smoke has cleared. A hen which, had she lived, had the potential of adding six to ten new turkeys to the population each year. Although our wild turkey population is in good shape, we still need every wild hen we've got and so do you. Take the time to be sure, and don't cheat yourself.

Aaron Pass

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The Iridescent GHOST

By Charlie Elliott

Before he's hatched, a male turkey lies in his shell, thinking up ways to outmaneuver the human hunter. This is a scientific fact to which any gobbler hunter will attest. There is simply no way any wild creature could develop such wariness and ingenuity to cope with what goes on around him unless this awareness had begun to develop in the pre-kindergarten stage.

Before he gets through pecking his way out of the capsule, the half-saturated little fellow pauses from time to time to look behind every bush, studying every leaf for movement by some unsuspected danger. Even before he becomes a fledgling, he is already developing his sense of survival.

A male turkey keeps at this sort of thing as long as he lives. As a poult he learns to flatten out against the ground and disappear before your very eyes, or to blend into a sprig of cover that wouldn't hide a grasshopper.

The longer he lives, the more this ability increases. It's simply incredible how little cover is needed to hide a 20-pound gobbler that stands 3 feet or taller with his neck stretched upward for a look around.

We were hunting quail on an island off the South Carolina coast. The grassy flats and open woods had an abundance of bobwhites that gave us some excellent shooting, both with coveys and with singles. We were told that the island also contained a sizeable population of wild turkeys. We'd seen plenty of signs, yet in two days of hunting quail we never encountered one of the big birds until late one afternoon. We had a dozen or more bobs and hens scattered out on a grassy flat. The grass was no more than ankle deep, with widely scattered clumps of very low sedge tufts.

Painting by Shade Steele

Our two pointers had been working that day as though charmed by some canine fairy princess and we were fast approaching our limit of quail. I was a bit miffed at myself because I'd missed the last two easy, straightaway shots, and when the two pointers came to attention in a completely open stretch of meadow, my hunting partner said with a sly smile, "Try this one. If you miss, I'll back you up."

I refrained from making some dignified reply, like, "Go to hell, will you," and we walked in behind one of the pointers that seemed to be certain he was on a quail.

I couldn't have been more startled if an Army bomber had flushed out of the grass right in front of the dog's nose. The gobbler that came off the ground looked *that* big! I was so tense and so ready that I couldn't have stayed my trigger finger if I'd tried. At such close range the shot string almost tore the head off that big tom turkey.

The gobbler weighed about 19 pounds. How it could have remained completely invisible in that ankle-deep grass until we almost stepped on it was a question that had both me and my shooting buddy shaking our heads in disbelief. I didn't think of going back over the ground at the time, but the grassy flat must have contained a shallow depression into which the bird had flattened itself when he first heard us make our appearance on the meadow. There he would have remained and let us hunt on by, if one of the dogs had not caught his scent and pointed. Later I saw a number of old toms pull this very same trick.

Bruce Brady, a Mississippi outdoor partner, relates an experience to show how effectively a gobbler can disappear when it is apparently standing on bare ground.

He and his son, Bruce Junior, were crossing an old roadway through turkey woods. When Bruce started up the far bank of the road, the boy— from a few steps behind him — suddenly hissed at his dad. Bruce Senior froze, then asked in a barely audible whisper, "What is it?"

"Big gobbler," the boy said, "standing in the road."

Bruce held his awkward position and turned his head as slowly as the minute hand on a clock, until he could see for a hundred yards down the roadway. It looked as flat and clean as a stretch of interstate.

"You've got an imagination," he whispered.

"No, sir!" the lad declared under his breath. "He was there. He didn't run or fly. He just sort of melted into the ground."

Big Bruce's decision came from years of experience with the big birds.

"Don't move. We'll stay here for a little while and see what happens."

His son crouched in a clump of brush where he'd gone down when he'd glimpsed the gobbler, and Bruce remained flattened against the bank, his eyes never leaving the length of roadway below him. For a quarter-hour or more they waited. Bruce was just about deciding that his son had seen an apparition and was tensing his muscles to get to his feet again when a gobbler seemed to materialize out of the earth in the middle of the road, about 75 yards from where he lay.

"I see him," he whispered. "Don't move."

The gobbler stood up slowly, stretched its neck, and looked all around. It remained motionless for long minutes. Then, apparently satisfied that its intruders were gone, that turkey walked slowly into the roadside brush. The two Bruces gave it a few minutes longer, then circled to get in front of it. An hour or more later, it came to Bruce's call.

They went back and examined the road where Bruce Junior had first seen the gobbler. A logging truck must have gone through a soft spot there, leaving a rut no more than 8 or 9 inches deep. That tom turkey had crowded its body into this depression and literally disappeared while young Brady was watching it.

Bill Rae had a variation of that experience when he and I hunted at Brooks Holleman's farm in South Alabama. This was years ago and Bill still refuses to believe it. "Even though I saw it with my own eyes," he says.

In the corner of a wide meadow along the creek, Brooks had planted a rye patch on which his deer and turkeys could graze. Both used it, too, especially in the early spring before the first wild grasses were high enough to become succulent forage.

Brooks built a blind on the woods side of his field, surrounding it with enough cover so that turkeys could approach the patch from any direction, which they usually did. You never knew whether one would come in from the wooded hillside or from the fringe of brush along the creek in front of the blind. A few very small scattered bushes grew in the meadow between the planted patch and creek, and these made up the only cover for a hundred yards.

Brooks and I left Bill in the blind one morning and went off down the creek to find a gobbling turkey. Bill has a lot of patience, even for a Yankee editor, and he remained quiet with only his eyes and ears busy, shifting his weight occasionally to relieve the the numbness that crept into his posterior padding where the ground had poked at it too long.

Not until midmorning did he see a turkey. He admitted it was possible that one might have come up noiselessly behind him, then retreated when he moved to shift his weight. The gobbler he first saw was approaching across the open meadow from the creek. It came warily, as turkeys do, stopping every few yards to listen and to examine the premises with an eye that apparently missed nothing.

The tom was standing near one of the thin, scraggly bushes when something in or around the field caught his attention. Bill didn't believe he had moved, though he said he might possibly have blinked an eye. The bird made a step or two and went out of of sight behind the bush, though that bush didn't seem large or thick enough to hide a jaybird. Bill estimated that the gobbler was almost within range of of his shot string and decided he'd try it when the tom made another two or three steps toward him. He put his gun against his shoulder and waited. After a few minutes when his arms began to shake under the strain, he put it down. The gobbler had not appeared.

Bill sat for more than an hour, concentrating on that bush. The field was open all around it and he could see the meadow beyond it all the way to the creek. Brooks and I found him thus transfixed when we came up on his blind from behind, after a long examination of the field and fringes around it to make certain no turkeys were in sight.

When Bill heard our footsteps close by, he whispered without turning his head, "Sh-h-h! There's a gobbler over there, right behind that sprig of bush."

"Which bush?"

He pointed it out. "He just walked behind it and never came out."

"How long ago was that?"

"More than an hour ago."

Brooks and I exchanged glances.

"He's probably on the other side of Wolf Creek by now," Brooks opined.

"There's no way he could have left that bush without me seeing him," Bill insisted.

He stepped out of the blind and we walked out to the sprig of bush. Bill kept his gun ready, as though he expected the gobbler to take to the air any second, but the field around us was as barren as if no turkey had been there in generations. Bill wouldn't believe it. "There just ain't no way!" he kept saying to himself.

It did seem to be an impossible feat, even for a wise old gobbler, but I've seen them pull many such maneuvers that are not in the books. This must be one of the tricks a turkey conceives while he's still curled up inside his egg shell. More times than the number of hairs on my head—well, more than that because these days I'm getting to look a little like Kojak from the hat-brim up—I've seen a gobbler step behind a tree or bush . . . and disappear. Once he has that body out of sight and out of danger, he turns and keeps the tree trunk behind him and runs straight away, as though the very devil were on his tail and jabbing at him with a pitchfork.

Any turkey can move along a depression so shallow that you hardly understand how even a pack rat could get by without being seen. Probably the most striking example I've had of this habit took place in the Ocoee Management Area of Tennessee, where I've been after gobblers for more than three decades.

I once told the following story to illustrate an entirely different point. It appeared in another book originally listed as *The Outdoor Observer,* but later revised and titled *How To Improve Your Game Eye.* Forgive me for repeating it here, but it seems entirely appropriate.

Most of the gobblers in isolated regions such as Ocoee have virtually the same routine. It seldom varies. If all conditions are right, a tom will gobble on the roost, maybe several times. He wants the hens within hearing to know the vicinity in which he plans to operate. After he hits the ground, he keeps on gobbling until one or more hens cozy up to him, or his ardor either cools or carries him under the sights of a hunter's gun. Whether or not he trades satisfaction with one or more of the hens, he usually shuts down his gobbling about midmorning, loses his interest in sex, and begins to take on vittles.

A tom may satisfy every desire, but he never loses his curiosity. At any time of day, he may answer a yelp or cluck—especially if he's alone. Both toms and hens are very gregarious characters. Many veteran turkey hunters I know spend the entire day in a blind, calling now and then to attract any gobbler that comes by or happens to feed within the sound of a yelper.

I've stuck out a few full mornings in a blind. But as much as I preach about patience, I've never had enough of the stuff myself to keep me there for a full day. I remember one morning when I remained rooted until time to gulp down my noon sandwich. Then I grew restless. I had heard nothing that even remotely resembled a turkey, and my every bone and muscle ached from long contact with the ground. The flies had eaten me once and were going over me a second time for dessert. So I decided to wander and look for fresh scratching and other signs that might help me locate a gobbler the next morning.

The rest of the day was ahead of me, and I was in no hurry. I made my way from one high cove to another, stopping on most of the backbones of the ridges to relax in a cool breeze and work my yelper, hoping for an answer. One of these spots seemed so pleasant that (after I'd tried a few tentative notes) I put my cedar box into my shoulder bag and just sat back to enjoy the shade and the breeze.

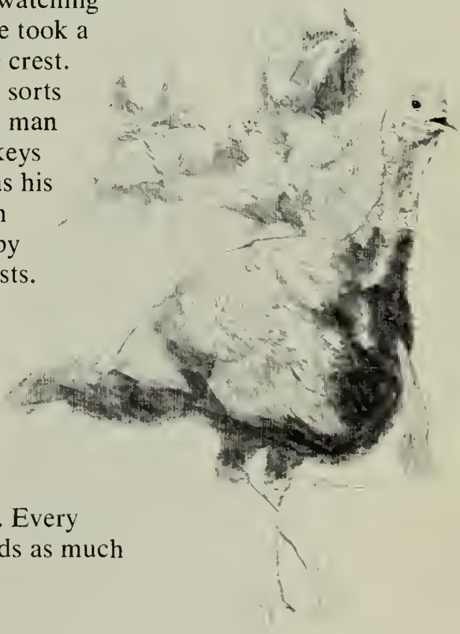
When, after an hour, the log I was on began to grow a new assemblage of knots, I picked up my gun and went prospecting for some more territory. I was on my way into a narrow cove at the base of the ridge when my eye caught a movement near a decaying treetop not more than 25 yards away.

It could have been a packrat, a towhee, a squirrel—almost any creature. I stood still, trying to see it a second time. The floor of the cove was so clean around the tree I could have seen anything that moved away from the mass of limbs. Whatever had caught my attention had to be still there. I walked over for a closer look.

I've never been any more startled than I was then when wings roared on the crest of a little knoll to my left. I swung just in time to get a glimpse of a big gobbler pitching over the contour. He was gone before I had even thought to bring my gun around.

I was even more surprised when I investigated that ground thoroughly and finally figured out what had happened. A depression no more than 12 inches deep ran down that knoll to the treetop. No vegetation of any kind grew around it. The gobbler had flattened himself into the shallow ditch and—to stay out of sight—must have gone up that gully like a snake. I just didn't see how that was possible—but he did. When I reached a point where I could have seen him had I not been watching the treetop so intently, he took a chance and flew over the crest.

A gobbler will pull all sorts of such stunts, and every man who has hunted tom turkeys over a period of years has his own list of experiences in which he was outwitted by one of the iridescent ghosts. Any turkey hunter will tell you about those times, too, if you're willing to sit down and listen and not keep interrupting to regale him with similar experiences of your own. Every turkey hunter I know finds as much



enjoyment in telling about the one that got away as he does in recounting his successes. Somehow a gobbler-chaser takes special pride in the wisdom of an old tom that's smarter than he is.

Brooks Holleman told me about two large gobblers he once saw feeding along the bank of a ditch that ran through one of his open fields. The ditch was deep enough for him to crouch slightly, walk up it, and yet remain out of sight all the way to where he could stand up and get a shot at the gobblers, which were on the north bank.

He tried to crawl to the open lower end of the ditch without being observed by the birds. Just before Brooks reached the point where he could duck completely out of sight, first one turkey and then the other stopped feeding and put his head up. Brooks lay still until the birds went back to grazing again, convinced that they were not afraid but just being cautious.

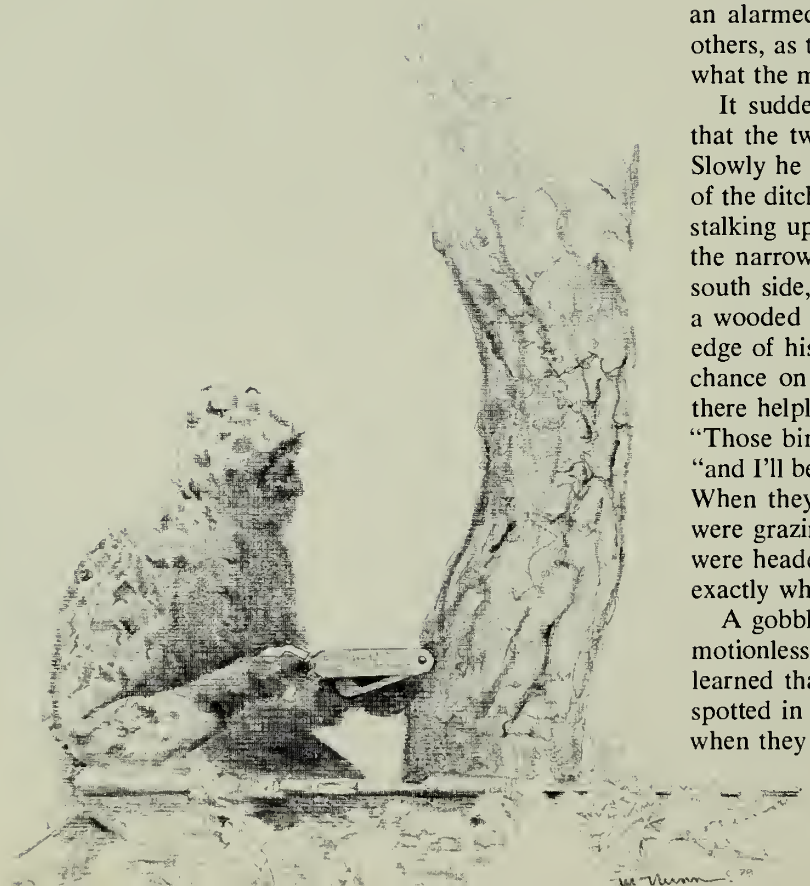
In a crouching position, Brooks moved up the cut as fast as possible. Then, just at the point where he knew the turkeys should be, he stopped and very slowly raised his head until only his camouflage cap and eyes showed through the tall grass that grew along the edge of the ditch bank.

He couldn't see them, but he knew they were very close. One of the turkeys gave a questioning *putt* in a low voice. Holleman strained his eyes, trying to find them The bird putted again, and this time the sound came from a little farther away. Brooks let his eyes range the meadow and examine every clump of grass in detail. Not a living creature seemed to be in sight.

Seconds passed and the bird made another note—not an alarmed *putt!* but one more inquisitive than the others, as though the gobbler were not quite certain what the movement at the edge of the ditch had been.

It suddenly dawned on our veteran turkey hunter that the two birds had completely outfoxed him. Slowly he swung from his scouting of the field north of the ditch and looked behind him. While he was stalking up the ditch, the gobblers had pitched over the narrow opening through the field, reached the south side, and were now walking unhurriedly toward a wooded creek nearby. They were just at the outer edge of his shotgun range, so he wouldn't take a chance on wounding one or both. Brooks crouched there helplessly and watched them walk out of sight. "Those birds changed directions on me," he said, "and I'll bet my last load of No. 6s it wasn't by accident. When they spotted me before I entered the ditch they were grazing toward the hill. When I got there, they were headed for the creek swamp, like they knew exactly what I was going to do."

A gobbler counts a lot on his ability to remain motionless, whether or not he is concealed. Maybe he learned that from the gyrations of hunters he has spotted in blinds or elsewhere who attempt to hide when they are afflicted with the fidgets as though they



had fleas. He seems to know instinctively that movement attracts the eye.

Once in North Florida's piney woods, I watched a gobbler that had no idea he was being spied on. He was feeding in vegetation that grew about as high as his shoulders, if he'd had any shoulders.

That gobbler would scratch and peck at something on the ground, then straighten up until only his neck and head were visible. After a long look around, he'd scratch and peck again.

A farm wagon came down the woods road that ran within a few yards of where the gobbler was feeding. He kept his head up, listening to the sounds of the wagon and the driver, who was carrying on a conversation with his mule. When they came into sight, the gobbler pulled his head down, probably crouching in the low brush, and remained hidden until the wagon had gone on down the road.

When all was quiet, he went back to feeding again, in the same spot. My bet is that most of us have been close to turkeys any number of times and never knew they were there. We'd have walked past that aforementioned tom on the South Carolina island, probably within yards, if the dogs hadn't smelled and pointed it.

Another example I had of this gobbler trait was in Georgia's Cohutta Moutnains, up against the Tennessee line.

Shortly after dawn I heard a gobbler, and as usual I tried to get close to it before the bird flew down off its roost. The woods were open. And though I didn't get as close as I would have liked, I had a feeling that the tom turkey had either seen me or otherwise knew I was there. He'd gobbled just once on the roost. I tried a variety of calls but couldn't get another peep out of him.

I worked at this calling for an hour, with no response. Then it dawned on me that, for some reason, the gobbler I had heard was in no way interested. If I wanted to look at a turkey over the sights of my shotgun that morning, I realized I'd better stir around and try to find a more agreeable bird. There was also a chance that I might get closer to the tom I'd heard on the roost and make him curious enough to investigate my calls.

I left my hastily constructed blind and moved cautiously toward where I thought the turkey might have flown down. Every hundred yards or so I'd stop and go through my usual routine of low cluck, a wait of a few minutes, a louder cluck, another wait, a slow yelp, wait, louder yelp, wait, and then a gobble on the box. After a quarter-hour in each place, I'd move again.

I passed within 50 feet of a heavy treetop where a giant oak had been felled by the wind. I remember thinking that it would make an excellent spot for a blind. Thirty or forty yards beyond it, I stopped to call again, leaned my gun against a tree, and reached for the wing-bone call that I carry on a thong

around my neck.

I swung around at the explosion of heavy wings, just in time to see a huge gobbler clear the treetops and roar away through the woods toward a mountain slope across the valley. I could only figure that the tom, silent though he had been during the early morning hours, was also curious and had been on his way to investigate my calls. When I met him on that open forest floor, possibly within gun range if I had seen him, he had ducked into the treetop. He'd crouched there and let me walk close by and on out of the danger zone. Maybe he'd even seen me lean my gun against the tree trunk. Anyhow, at exactly the right moment, he took off for the distant slope.

I could only surmise that this was one of those maneuvers he had conceived years before, while he lay curled up in his shell, waiting to be hatched. ●

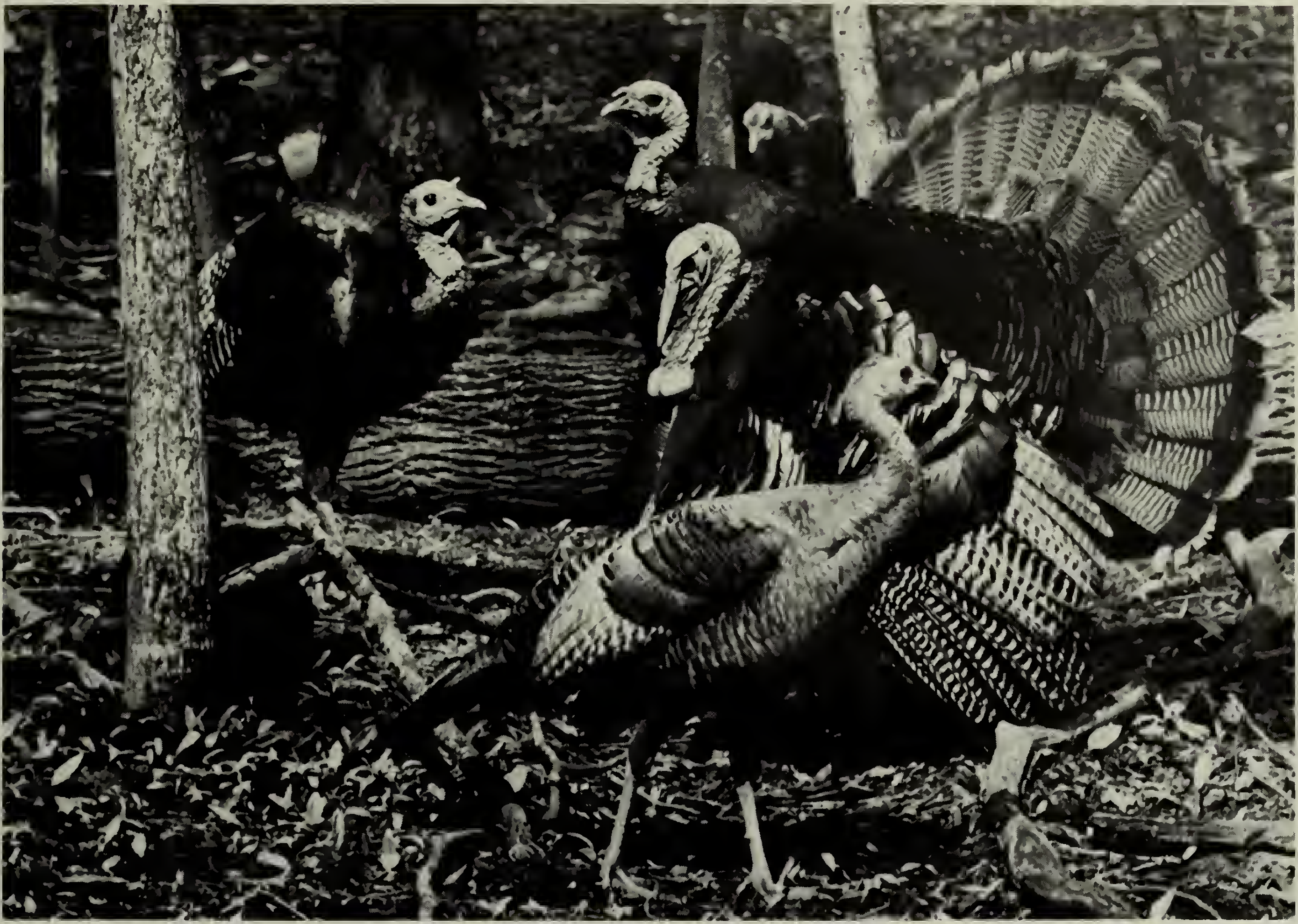
Charlie Elliott is one of the patron saints of southern turkey hunting. In his long outdoor writing career, he has produced many turkey hunting stories and may be partially responsible for a whole generation of turkey hunting enthusiasts.

This story, "The Iridescent Ghost," is a chapter in Charlie's new book, Turkey Hunting with Charlie Elliott, ©1979 Charles Elliott, and is reprinted by permission of the David McKay Company, Inc., 750 Third Avenue, New York, New York 10017.

Published earlier this year, Turkey Hunting with Charlie Elliott sells for $14.95. For more information, contact your local bookstore or write the publisher, David McKay Company (address above).

Wild Turkey Restoration
A Status Report

By Ron Simpson



Leonard Lee Rue III

The eastern wild turkey (*Meleagris gallopavo silvestris*) will probably never be as abundant in Georgia as the whitetail deer because of its more exacting habitat requirements. However, through a concentrated restoration effort begun in 1973, the statewide distribution and population of this magnificent bird are gradually increasing.

At the beginning of our present efforts in restoration of the wild turkey, a county by county inventory was made to estimate existing populations, their distribution and factors limiting population growth. From these county inventories, the statewide population in 1973 was estimated to be between 15,000 and 18,000 turkeys. Surprisingly, wild turkeys were reported to exist in 121 of our 159 counties. Many of the counties, however, had only remnant populations consisting of a few birds such as a single flock of 6 or 8 along a particular creek or river course. Trends in county population levels indicated a general decline in turkeys around the state. Populations were reported to be stable in 45 counties, declining in 47 counties and increasing in only 29 counties.

Factors adversely affecting populations were varied. Lack of suitable habitat and reduction of habitat (urbanization, clearing of large acreages for agriculture, clear cutting of timber and increased forest land in pine pulpwood production) were indicated as the major population limiting factors in 136 counties. Illegal hunting was listed as being important in 66 counties. All other factors ranked considerably below these two. Disease, genetic pollution from interbreeding with pen-raised wild turkeys and domestic turkeys, and human activity were indicated in four, three and two counties, respectively. Predation (by free-ranging dogs) was thought to be a major factor in only one county.

Release Site Requirements

Wild turkeys available for restoration purposes are in short supply, so to best utilize those captured, six requirements were established for potential release sites when the effort first started. The present qualifications necessary for a site to be considered for stocking are: 1) the area must be void of wild turkeys; 2) the area has to have suitable habitat; 3) the area must be at least 8,000 acres in size (not necessarily under one ownership); 4) there must be additional areas of suitable habitat adjacent to the release site for turkey population expansion; 5) the area has to be situated for rigid protection; and 6) the area must have relative stability from change for at least the next five years. Sites meeting these requirements are evaluated and rated. The rating an area is given is based on how it compares with other turkey habitat in the same physiographic region. It is updated annually for each proposed site as not all sites evaluated each year can be stocked. Sixty-six potential sites have been recommended, evaluated and rated.

Capture and Stocking Procedures

As mentioned, the number of wild turkeys available for restoration work each year is very limited. Thus, the first and sometimes most difficult step in the restoration program is to locate areas where a few turkeys can be removed without adversely affecting the population and where permission to remove these can be obtained. Well over half of the birds used thus far in the restoration program have come from privately owned lands.

When a source of wild birds is located and permission obtained to capture a specified number, the birds are enticed to a bait site during the period from January to April. One of two methods is used in capturing the birds, the rocket net or tribromoethanol, a tranquilizing drug. The rocket net is used primarily in areas where shrubs and trees would not interfere with the net when it is fired over a flock. Turkeys in woodland areas where a net cannot be fired are caught using tribromoethanol-treated bait. About two-thirds of the birds captured during the six years of relocation work have been with the rocket net.

Once caught, the turkeys are handled rapidly and with as little excitement of the bird as possible. Vital data (age, sex, weight, beard length and spur length) is collected on each bird. The birds are also banded and wing streamers attached for field identification. Birds are usually transported the same day of capture or no later than the day after capture to the release site.

An average of about 12 birds are released per site. Three adult gobblers and nine hens is an ideal stocking. This may seem like a small number of birds, but over the years it has proven to be very adequate. By not using an excessive number of birds on any one site, more areas can be stocked with the supply of birds available.

The day after a release is made, the immediate release site is checked to determine if any mortality or injuries occurred. This is rare, but the full complement of birds is needed to help assure a successful release. Also, an annual follow-up evaluation of each release is made for three years. Information gathered is primarily on the production of young, population increase and movement of birds on and from the release site. The establishment of the population and prospects of continued expansion can usually be assessed by the end of the third year.

Stocking Results

During the six late winter - early spring trapping seasons between 1973 and 1978, a total of 436 wild turkeys were captured and released. With these birds it was possible to stock 36 of the 66 evaluated release sites and to partially stock three others. The acreage in the 36 sites totals about 590,000 acres.

Evaluations of these stockings indicate a considerable degree of success and add encouragement to hopes for the future of the wild turkey in Georgia. Success of the releases is best reflected in results obtained on 1973, 1974 and 1975 release sites where final evaluations have been made. Twenty-two sites were stocked with a total of 243 turkeys during these three years. The present estimated populations on all 22 sites is slightly over 1,600 birds, a 560% increase. The magnitude of this increase is really apparent when the increase in populations from releases is compared to populations existing in these counties before the releases were made. The populations, countywide, are now about 309% higher than the 1973 estimated populations before any releases were made.

Two counties, Webster and Upson, and one wildlife management area, West Point W.M.A., have populations which have expanded to the level at which some hunting is permissible. These areas also supply a few birds for restoration work. The turkey population establishment on West Point W.M.A. is representative of the highly successful stockings. Only nine turkeys were released on the area during the early spring of 1974. By the spring of 1978 the population was estimated to be between 175 and 200 turkeys. Prior to the 1978 spring turkey hunting season, 10 birds were captured for use in stocking another area. The spring gobbler hunt conducted on the area resulted in 10 gobblers being harvested.

What about the other release sites? Eight of the sites have populations which have increased to between 75 and 150 birds. Of the 1973-1975 releases, including those in Webster and Upson counties and on West Point W.M.A., 15 have population responses which are rated as excellent with good prospects for continued population expansion. Populations from four releases are rated as good with fair propsects for ex-

Bob Wilson

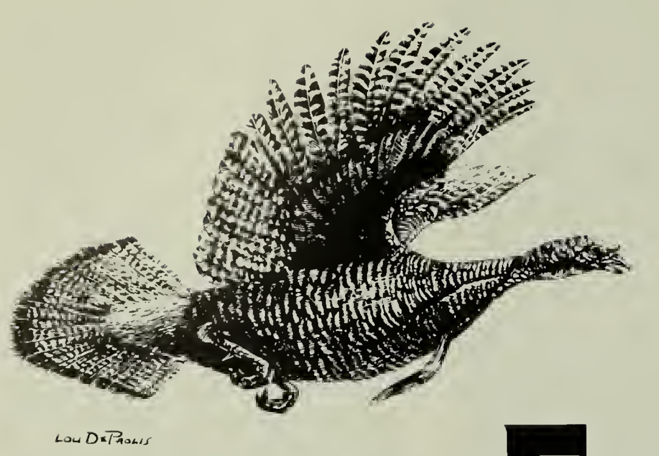
Trapping of wild turkeys for use in restocking efforts has proven to be more successful than using pen-raised birds. Once caught, the turkeys are examined to determine vital data, they are banded and wing streamers are attached for easy identification.

pansion. Movement off these original release sites has occurred as the populations have increased. This expansion is expected to continue until all adjoining areas of habitat are populated. Turkey population response is rated as poor on only three sites. Birds are still present on these areas, but there has been little increase in the number of birds beyond that stocked. The probable major causes of the poor response are reductions in habitat quality from timber operations and the resulting greater access and human activity.

Future Prospects

Overall the turkey population in Georgia has been expanding during the last few years and should continue to grow and expand its range for a number of years because there is a considerable amount of vacant habitat capable of supporting turkeys. However, it must be realized that while there will be gains in some areas, there will also be losses in others as "development" and land use changes occur.

Sportsmen can help the wild turkey by supporting state restorations on harvest. These regulations are designed to allow utilization of this resource without interfering with existing or expanding populations. Through such efforts the sportsman can have an active part in assuring the wild turkey a place in Georgia's woodlands for future generations to enjoy. ●



National Wild Turkey Federation

By Gene Smith, National Wild Turkey Federation

Thanks to a good track record and help from its members and its friends and co-workers in wildlife conservation, more and more people are hearing about the National Wild Turkey Federation, Inc. And the more they hear, the more they want to know. The more they learn, the more they're willing to help make it go.

That is the only logical explanation for the rapid growth and accomplishments of the six-year-old organization, which now has members in all 50 states and a dozen foreign countries, and 75 state and local chapters from coast to coast.

What is the NWTF exactly? It is a national, nonprofit, educational conservation organization working for the restoration and wise management of the American wild turkey and other valuable wildlife resources.

What does the NWTF do? It supports scientific wildlife management on public, private and corporate lands. It upholds traditional American sport hunting. It emphasizes the need for clean air and water and every citizen's right to enjoy an aesthetically pleasing outdoor environment.

Those are general areas, though. Specifically the wild turkey is the recipient of the Federation's primary attention. It works to see that good wild turkey habitat is identified and preserved; it helps state game and fish agencies educate landowners, sportsmen and the general public to the basic requirements of the wild turkey; it supports financially some of the wild turkey research projects being carried on by colleges, universities and governmental agencies around the country; it has welded together enough grass roots support, through membership strength, to make a decisive difference wherever and whenever the wild turkey or its habitat needs to be defended.

The National Wild Turkey Federation, Inc., was chartered on March 28, 1973, in Fredericksburg, Virginia, by its founder and executive vice president, Tom Rodgers. Rodgers relocated to Edgefield, South Carolina in June 1973 and established the first permanent NWTF headquarters, in modest rented offices.

"Heading up a nationwide movement was the last thing on Rodgers' mind in 1969 when he completed a B.S. in Education at Tennessee Tech," wrote Sam Venable, outdoors editor of *The Knoxville News-Sentinel,* last June after an interview with Tom.

" 'I went back home (to Fredericksburg, Virginia), got married and started teaching,' noted Tom. 'I also wrote an outdoor column for several area newspapers, then began to sell insurance. Through it all, I was hunting those ol' turkeys, just like I had all my life.'

"But the more Tom hiked the ridges and bottoms of nothern Virginia, the more alarmed he became.

" 'Factories were popping up everywhere. Cities were expanding,' he recalled. 'What forest land they didn't take was being cut all to hell by timber companies. Turkey flocks were on their way out in some regions of the country. So in 1972, I set out to write a book about the crisis.

" 'Every time I turned up some good research, I found out just how ignorant I was about turkeys and their management. So I switched to the idea of putting together a magazine on this fine game bird. Next thing I knew, the Federation was shaping up in my mind.' "

From then on, Rodgers began to solicit help at organizing, both in the professional wildlife management field and in the area of popular support, for he realized that such an organization's strength would lie in dedicated support and involvement—

dues-paying involvement. He was confident that not only turkey hunters but wildlife enthusiasts in general would wish to become members if they were sure their tax-deductible donations and membership dues were put to good use.

Sure enough, the support was there. By the end of 1973, the Federation had 2,000 members. Then, in January 1974, the first state chapter was formed, in Columbia, S.C. One month later the Georgia state chapter was formed as the second on the road to the 75 current local affiliates.

For assistance in laying the organizational groundwork, Rodgers first got the help of an advisory board. Later, a full-blown technical committee of professional wild turkey biologists was enlisted. It was headed by North Carolina's R. Wayne Bailey, a nationally prominent wild turkey authority. Georgia's representative on the NWTF Technical Committee is wildlife biologist Ronald Simpson of Albany who directs the Wild Turkey Restoration project for the Georgia Department of Natural Resources (Also see *Turkey Restoration Update,* this issue.)

Gradually, Rodgers added several key national headquarters staff positions: an executive secretary, later replaced by a director of chapter development; an editor and publications coordinator; a wild turkey biologist; and an administrative assistant/membership services director.

Through its own efforts, and with the use of excellent contact lists, the Federation was 30,000 members strong by late 1977, and today the membership is near 35,000.

The Federation is governed by an eleven-member national board of directors, national officers which are elected annually, and a six-member executive committee that meets quarterly. As chief administrator, Executive Vice President Tom Rodgers is a member of that committee.

To achieve good communications with its membership, and to accomplish a part of its educational objectives, the Federation publishes *Turkey Call* magazine, which Rodgers began in 1973 as a quarterly. It is now mailed bimonthly, at special educational second class rates. It is written and edited with the wild turkey enthusiast in mind. *Turkey Call* keeps Federation members abreast of wild turkey restoration and management state by state, it carries a good deal of where-to and how-to articles and illustrations about turkey hunting and calling, it reports chapter activities and other news of interest to the membership, and it speaks out editorially on important matters affecting the status and future of the wild turkey.

A good example of *Turkey Call's* editorial stance appeared in the January-February 1978 issue. The subject was pen-raised turkeys. The editorial pointed out that the releasing of pen-raised birds into the wild was an outdated, wasteful, ineffective, and usually harmful way to go about turkey restoration work, and it explained that the trapping and relocation of pure wild turkeys is the only proven technique that works

This brood of turkey poults is in the most critical period of their lives. Those that survive the next few crucial weeks stand a good chance of making it to adulthood.

Lovett Williams, Jr.

The guiding lights of the National Wild Turkey Federation, from left: Gene Smith, editor of Turkey Call Magazine; *Rob Keck, director of chapter development; and Tom Rodgers, originator/founder of the federation.*

consistently to bring back wild turkey flocks where the habitat is available but lacking wild birds.

Pen-reared turkeys have lost their wildness and are dependent on man by the time they are old enough to be turned out. Too, they are genetically inferior to pure wild turkeys and are not nearly as intelligent or wary. Also, they are likely to transmit domestic poultry disease organisms to any wild birds with which they might come into contact. This position was approved by members of the NWTF Technical Committee and reflects the feeling of most professional wildlife managers in the country.

That *Turkey Call* editorial contained a strongly-worded resolution supporting scientific wild turkey research and management while condemning the releasing of "game farm" birds. It called on all interests to "assist the cause of the wild turkey by courageously and resolutely opposing the release into the wild of pen-raised turkeys from any source, for any purpose, by an individual, club, organization or governmental agency, except that private shooting preserves shall have the privilege of using such stock, provided adequate precautions are taken against the possible escape of these birds onto occupied or potential wild turkey habitat on public or private lands."

The fantastic comeback of the American wild turkey in recent years shows the validity of the wild-trap-and-transplant method and underscores the need for a professional scientific approach to wild turkey restoration.

According to available literature, the ancestral range of the wild turkey included all or portions of 39 of the original 48 contiguous states. Those not having native wild turkeys were California, Idaho, Montana, Nevada, North Dakota, Oregon, Utah, Washington, and Wyoming.

By the 1930s, wild turkeys were found in only 21 states, and some of those populations were very, very low. The 18 states that had lost their wild turkeys were Connecticut, Delaware, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, Ohio, Rhode Island, South Dakota, Vermont, and Wisconsin.

At the low point, in the late 1930s, there were perhaps only 20-30,000 birds left, of the millions that had once been found in North American forests.

Changing land use patterns had caused the wild turkey's decline: major agricultural expansion; heavy timbering; and frequent, large wildfires. Too, the year-round hunting of wild turkeys, for home consumption and for the market, had contributed to their plight. But then the rebuilding began, and today, 47 of our 50 states, including even Hawaii, have wild turkey populations, thanks to nearly 40 years of scientific restoration and management work. All states except Alaska, Delaware, and Rhode Island now have wild turkeys.

So successful has been its reintroduction to favorable unoccupied habitat that, as can be seen, the wild turkey is presently found in states beyond its ancestral range. The total population today is placed at just over 1.5 million birds, according to the latest NWTF survey of states.

Thirty-nine states had a spring gobbler season last year, and 28 had open seasons last fall. As populations of transplanted wild turkeys increase, more and more states will permit sportsmen to harvest them.

Large landowners are showing increasing concern for protecting known wild turkey flocks on their property, and they are encouraged by the NWTF to make necessary allowances for these valuable big game birds in their management plans.

The National Wild Turkey Federation has led the way in opening lines of communication with both private and governmental land managers concerning the needs of wild turkeys, and it has encouraged its chapter members to become involved in this type of dialogue at the local level. Only by visiting and discussing turkeys and good turkey habitat needs with land managers can the local sportsman-conservationist-turkey hunter-Federation member hope

Bob Wilson

Bob Wilson

The cannon net was a major advance in wild turkey management which allowed the trapping of wild birds for restocking.

to turn the tide even more in favor of the wild turkey.

Other work the Federation does is through grants for wild turkey research. To date, four grants totalling $7,200 have been awarded to assist wild turkey study projects at the U.S. Forest Service's Northeastern Forest Experiment Station, Morgantown, West Virginia; at the University of Minnesota; at Auburn University in Alabama; and at the University of Arkansas.

The state chapter in Minnesota contributed $300 toward the study being conducted there, and other Federation affiliates will undoubtedly follow suit as their treasuries build.

The NWTF's Technical Committee screens grant applications and makes recommendations as to those it feels are most deserving of assistance. Of course, the availability of funds is always a consideration.

The Federation gets into other practical matters, too. The production and distribution of 2,000 special turkey transport boxes last year, in cooperation with St. Regis Paper Company, has helped facilitate the transporting of birds to form new flocks. The boxes were given to state turkey project biologists who trap wild birds for relocation.

Other companies have expressed an interest in this program, and it is welcomed help, for every expense that can be spared in the various state wild turkey project budgets will make their own funds go further.

The distribution of the special reusable turkey transport boxes is expected to be an annual service.

The NWTF has three major sources of income: (1) tax-deductible membership dues (regular, $10; sustaining, $25; sponsor, $100; life, $250; corporate, $1,000); (2) the voluntary purchase of wild turkey stamps and stamp art prints (the series was begun in 1976, and a major national art contest is held

This captured gobbler and a few lady friends will soon be on their way to a new home. The NWTF supports the relocation of wild birds as the most reliable restocking plan.

annually to select a new design); and (3) the sale of nature and educational materials and other selected items.

Advertising pays a portion of the costs of publishing and distributing *Turkey Call* magazine, but the expenses of printing and distributing educational brochures, posters, and similar items come from general operating funds. The NWTF's budget now totals well over $300,000 a year, of which 65% or better goes for conservation education, research and restoration endeavors.

The Federation has held two annual conventions — in Hershey, Pennsylvania in February 1977; and at Kansas City, Missouri in February 1978. The third annual national convention and meeting is about to crank up in Birmingham, Alabama on March 15, 16, 17.

As usual, there will be exhibits, awards, workshops, seminars on wild turkey management and hunting, motion pictures, the annual business meeting, elections, a banquet and all-around family fun.

A highlight will be the Grand National Wild Turkey Calling Championships on March 17 at the Birmingham-Jefferson Civic Center.

Convention headquarters will be the Birmingham Hyatt House, at 901 21st Street North.

What's ahead for the National Wild Turkey Federation? There are plans for increased growth and plans to build. Ambitious? Maybe. But feasible, you bet.

A solid indication that there's room for growth came in the results of the most recent National Survey of Hunting, Fishing and Wildlife-Associated Recreation in this country published in 1977 by the U.S. Fish and Wildlife Service.

That survey identified 1.7 million turkey hunters who hunted 8.8 million man-days in 1975, the year surveyed. That makes turkey hunting the second most popular big game hunting in America, in terms of days of participation, behind white-tailed deer hunting.

NWTF would like to enlist more of that veritable army of wild turkey enthusiasts for its membership rolls. That's the kind of strength and unity that would command attention and would be capable of supporting an ever-broadening range of activities on the wild turkey's behalf while also enabling the organization to provide better and better services for its membership.

The Executive Committee met in Edgefield last August to officially open a nationwide fund raising campaign to raise half a million dollars to construct the nation's first Wild Turkey Research Center.

A 6.62-acre tract, located on U.S. Highway 25 southeast of Edgefield, has been donated to the Federation as the site of the new national headquarters building and research facility. It was given by the Flexo-plate Division of Tranter, Incorporated.

Besides administrative and editorial offices, the new center will house research divisions in both wildlife management and forestry, plus a wild turkey museum and hall of fame, a reference library and, eventually, a living nature center complex featuring all the major subspecies of wild turkey and other selected native wild birds and mammals. It should be an interesting and educational point of interest not only for wild turkey enthusiasts but for everyone.

The NWTF is indeed on the move, and the national awareness Tom Rodgers first envisioned for the wild turkey has materialized. Those wishing to have a part in this work should write the National Wild Turkey Federation, Wild Turkey Building, Edgefield, SC 29824, or call 803-637-3106 and ask what you can do to help the wild turkey. ●

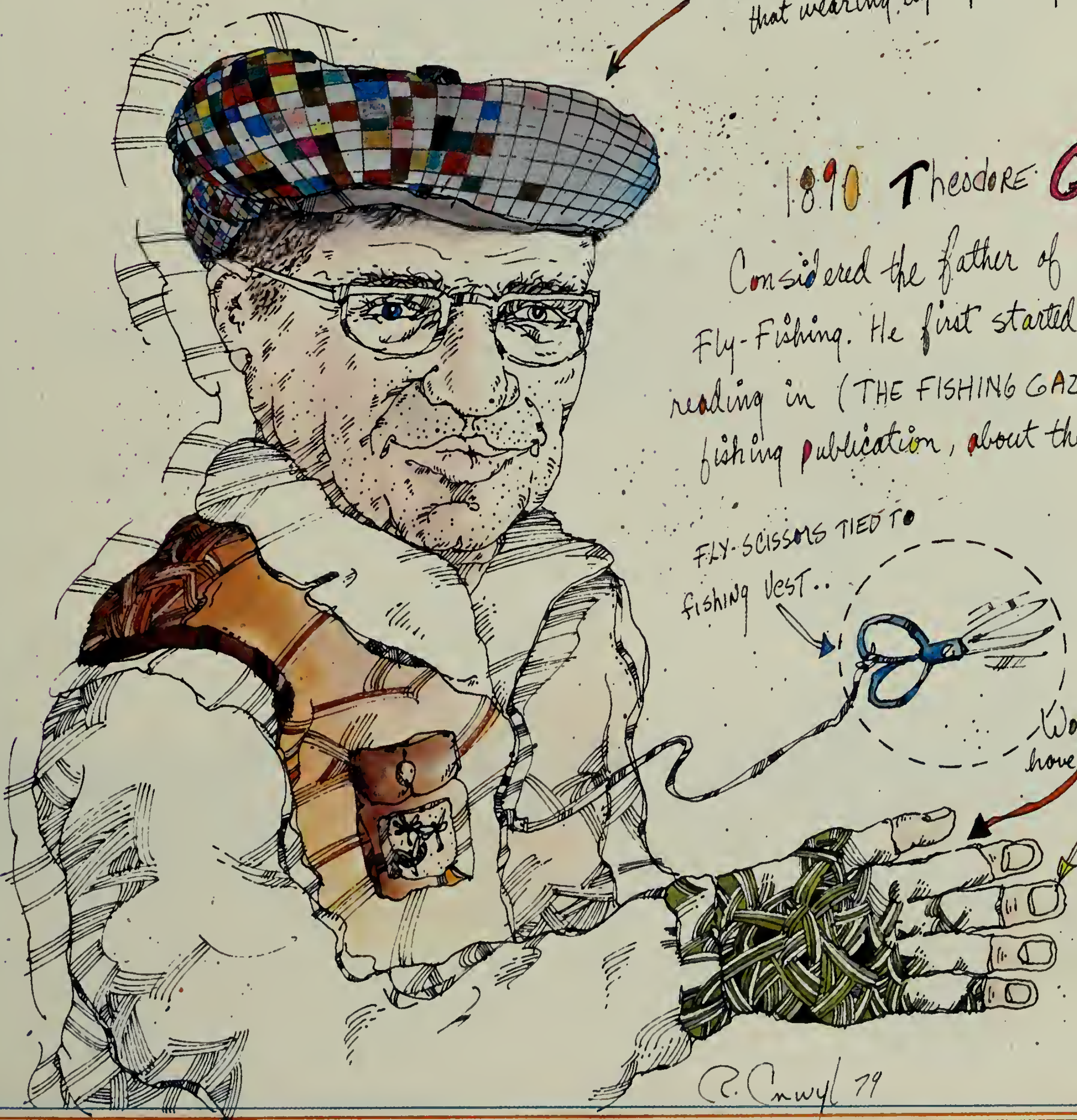
Gene Smith, editor of *Turkey Call* magazine, is from Walhalla, S.C. He is a former editor of *Florida Wildlife* and was a freelance outdoor writer. Gene and his family currently live in Edgefield, S.C.

THE FISHERMAN & FISH....

By: Rick Anwyl

"Not unlike Lemmings to the sea, each spring Armed & Cloaked they come. Immersed in a fervor of excitement, they begin their quest. What unseen force has brought them? For what purpose? What conceivable allure has this shallow, fast water to man? Speculations are as varied as the feathered hooks they sail into countless pools & jetties. Perhaps, the visions of seasons past, or dreams of strikes to come. Logic holds no answers here. You see, the trout are once more rising on the Chattooga."

Wool Tweed fishing Cap.... Rumor has it that wearing cap improves your casting:



1890 Theodore Gorden

Considered the father of American Fly-Fishing. He first started fly fishing after reading in (THE FISHING GAZZETTE) an English fishing publication, about the art.

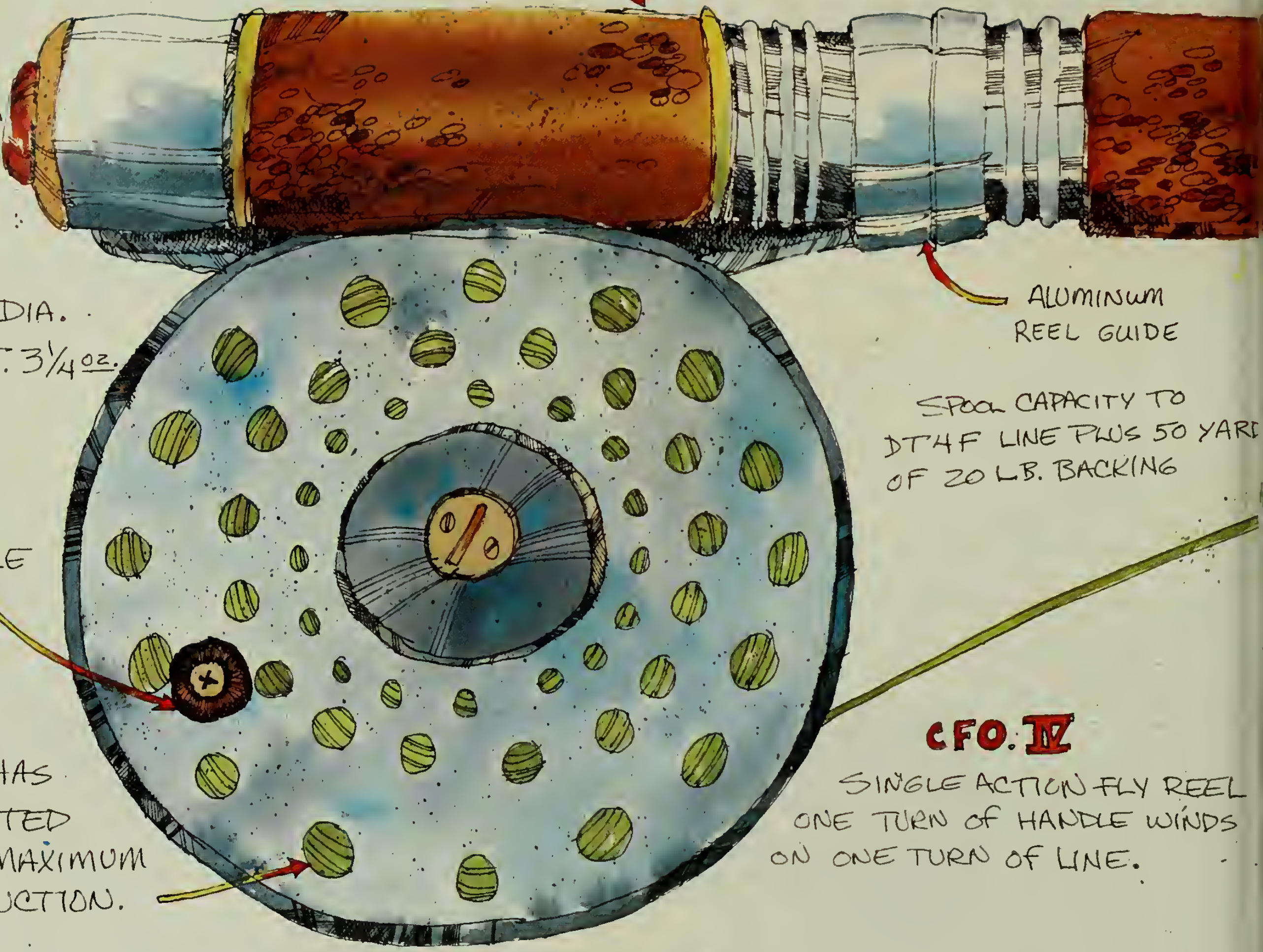
CIRCA. LATE 1800'S...

(THEODORE GORDEN 1854 TO 1915)

FLY-SCISSORS TIED TO fishing Vest..

Wool Fishing gloves which have the fingers cut out for better feel of the line....

R. Anwyl 79



ROD BUTT

CORK/BACK GRIP

CORK HAND GRI

ALUMINUM REEL GUIDE

REEL 3 3/16" DIA.
APPROX. WT. 3¼ oz.

SPOOL CAPACITY TO DT4F LINE PLUS 50 YAR OF 20 LB. BACKING

REEL HANDLE

C.F.O. IV

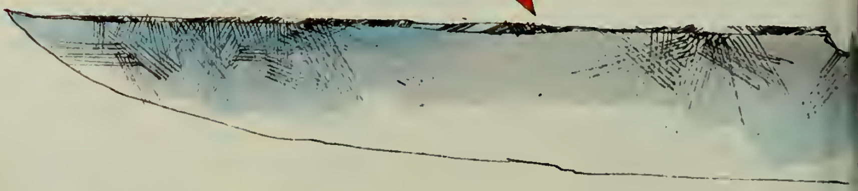
SINGLE ACTION FLY REEL ONE TURN OF HANDLE WINDS ON ONE TURN OF LINE.

REEL SPOOL HAS FULLY VENTILATED CASING FOR MAXIMUM WEIGHT REDUCTION.

AGATE OR TUNGSTEN STEEL GUIDE PREVENTS WEARING ON THE LINE IN STRIPPING IT FROM THE REEL.

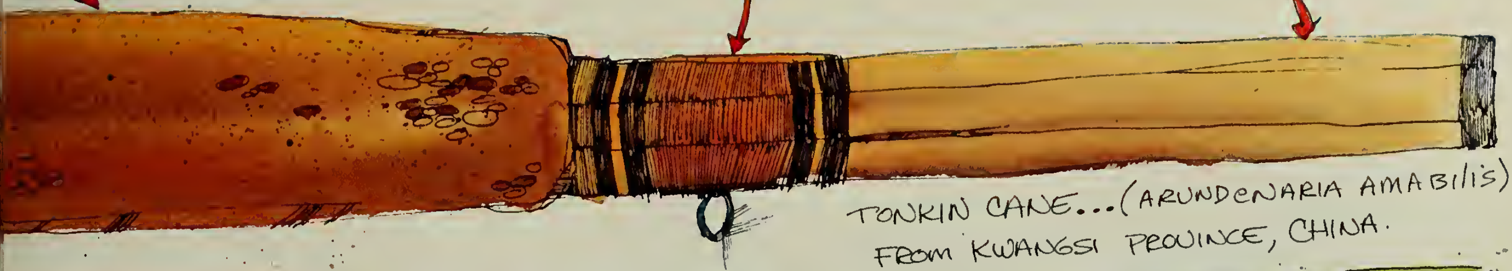
SIDE VIEW OF C.F.O. IV REEL (UPSIDE DOWN)

(ROD BUTT)



TEMPERED STAINLESS STEEL KNIFE BLADE.

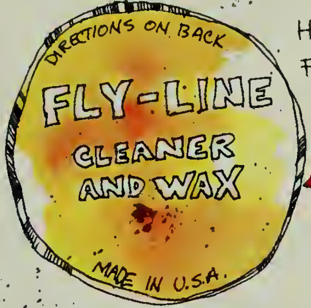
All PURPOSE FILET KNIFE
GREAT FOR SCALING AND FILETING FISH.



TONKIN CANE...(ARUNDENARIA AMABILIS) FROM KWANGSI PROVINCE, CHINA.

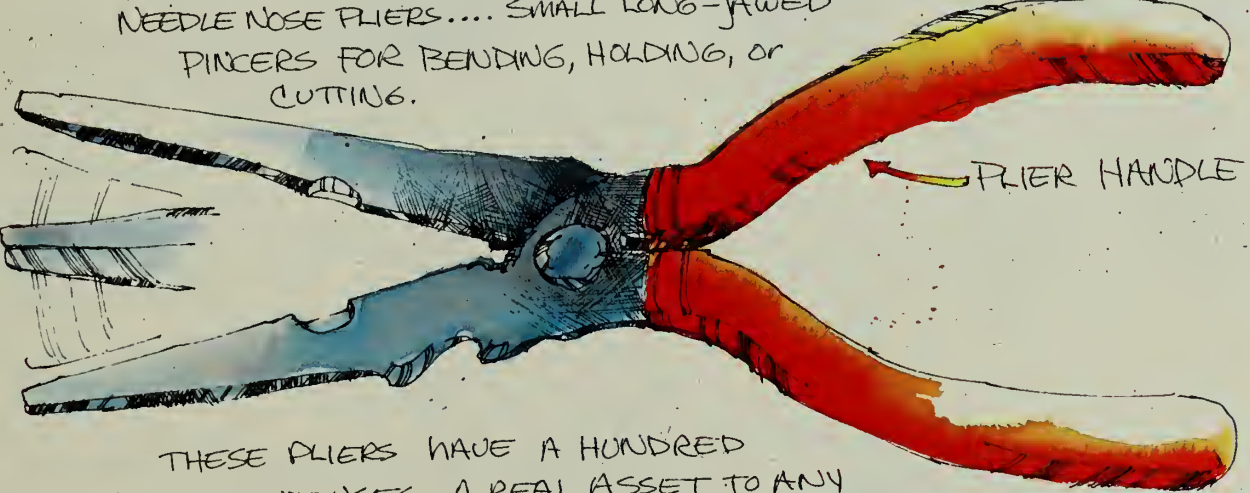
WIPE CLEANER ON FLY LINE WITH SOFT Cloth, or RAG.

FIRST INTRODUCED BY HIRAM L. LEONARD IN 1870. THE SIX SECTION HAND SEAMED FLY ROD WAS A REAL MASTERPIECE. THE FIRST CORK GRIPS APPEARED ON RODS IN 1888. PRIOR TO THEN THEY WERE PRODUCED FROM HARDWOODS, SUCH AS ASH.

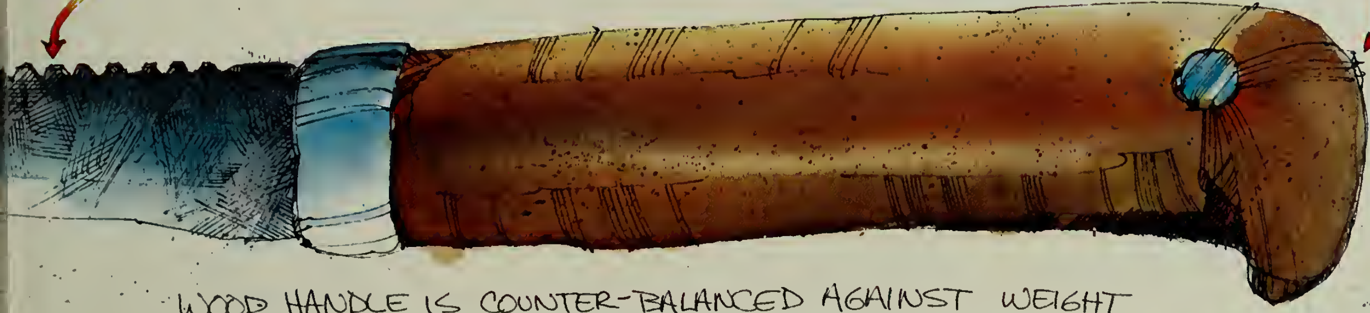


HELPS KEEP FLY-LINE DRY AND FLOATIN

NEEDLE NOSE PLIERS.... SMALL LONG-JAWED PINCERS FOR BENDING, HOLDING, or CUTTING.

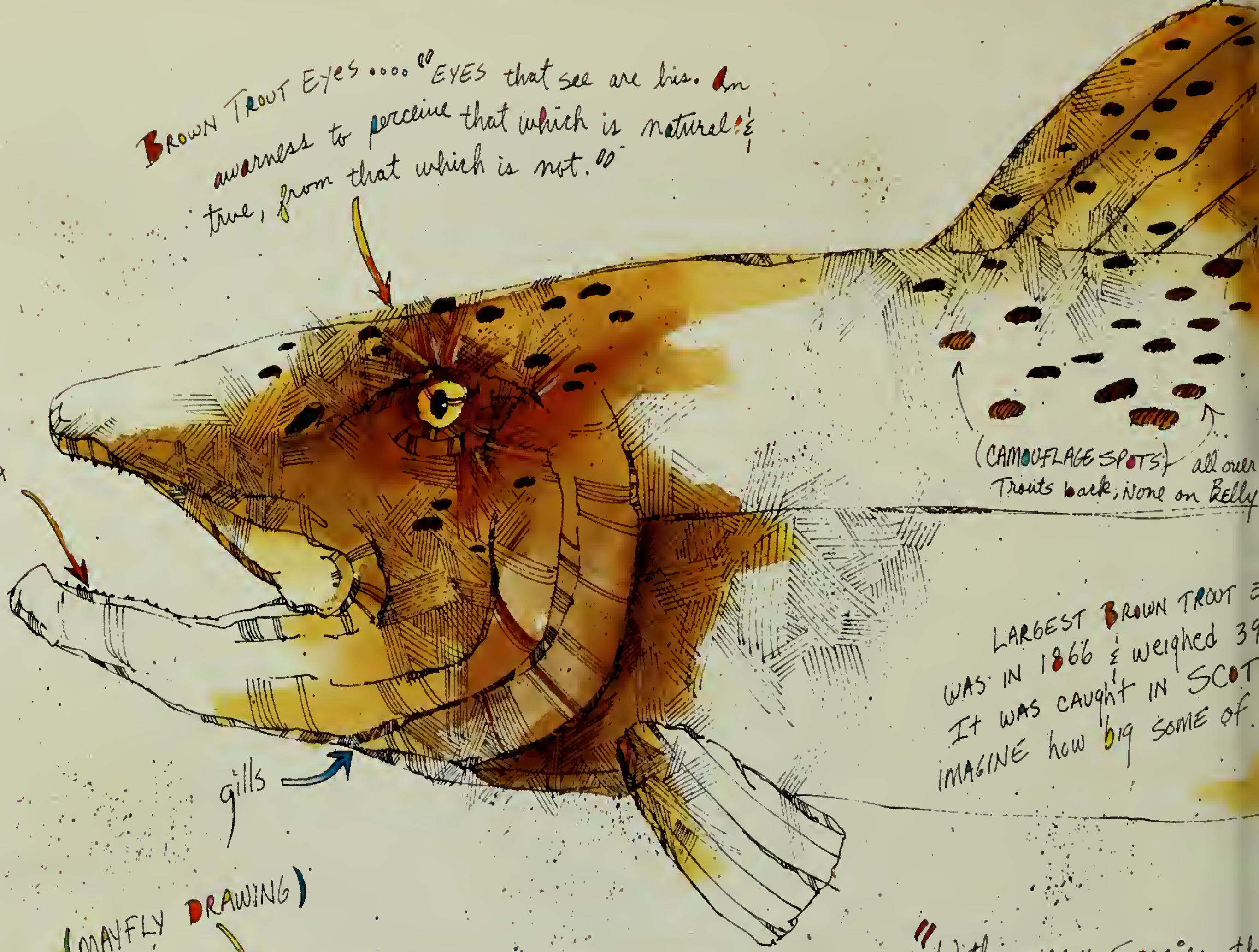


THESE PLIERS HAVE A HUNDRED DIFFERENT USES. A REAL ASSET TO ANY FISHERMAN'S TACKLE BOX.



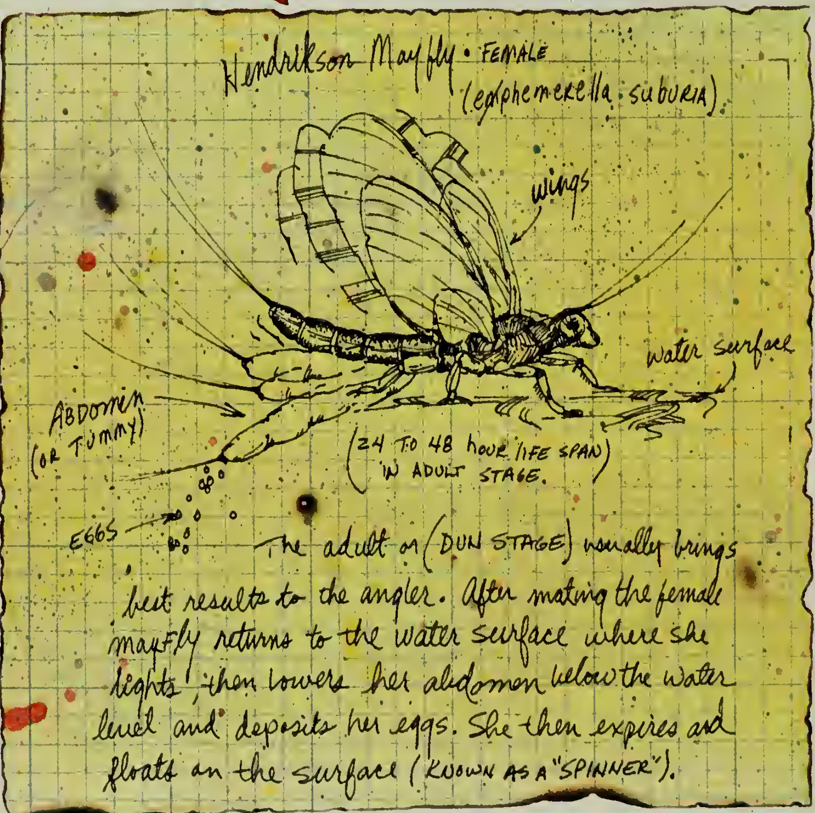
WOOD HANDLE IS COUNTER-BALANCED AGAINST WEIGHT OF BLADE TO MAINTAIN BUOYANCY IF KNIFE IS DROPPED IN WATER.

BROWN TROUT EYES .... "EYES that see are his. An awarness to perceive that which is natural & true, from that which is not."



LARGEST BROWN TROUT
WAS IN 1866 & weighed 39
It WAS CAUGHT IN SCOT
IMAGINE how big SOME OF.

(MAYFLY DRAWING)



Hendrikson Mayfly • FEMALE (ephemerella suburia)

(24 TO 48 hour life SPAN IN ADULT STAGE.)

The adult or (DUN STAGE) usually brings best results to the angler. After mating the female mayfly returns to the water surface where she lights, then lowers her abdomen below the water level and deposits her eggs. She then expires and floats on the surface (KNOWN AS A "SPINNER").

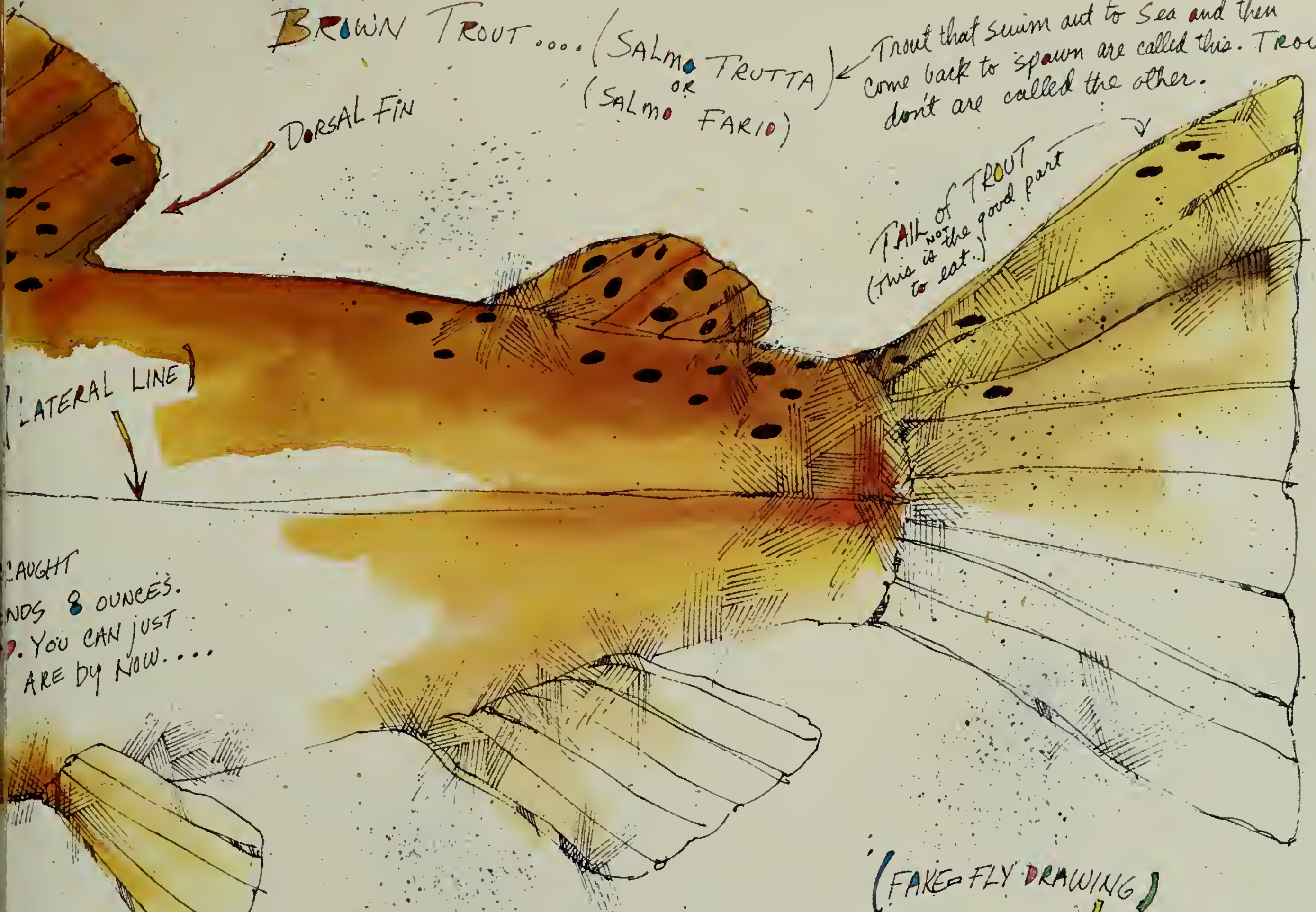
"Within any Species th
which an almost myst
attached. So it is wi
the BROWN."

BROWN TROUT FOOD...

Brown trout eat mayfly's like people eat popcorn. Especially trout 3 to 4 pounds or smaller. The big hummer's just eat them when there is, whats called a hatch. A hatch is when 100s & 100s of the mayfly's hatch out at the same time. That will bring the real big ones out of their holes, & up to the surface.

BROWN TROUT.... (SALMO TRUTTA) OR (SALMO FARIO)

Trout that swim out to Sea and then come back to spawn are called this. Trout that don't are called the other.


DORSAL FIN
TAIL OF TROUT (This is not the good part to eat.)
LATERAL LINE

CAUGHT
NDS 8 OUNCES.
?. YOU CAN JUST
ARE BY NOW....

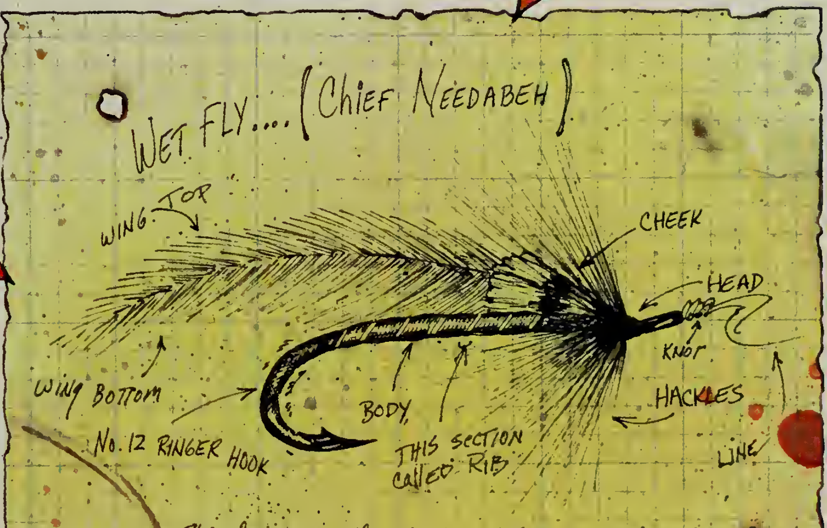
is always one to
everence is justly
Traut and so it is with

(FAKE FLY DRAWING)

ARTIFICIAL BROWN TROUT FOOD....

Some more information on Brown trout, the big Lunkers (ALSO CALLED HUMMERS). When a brown gets to be SAY 15 LBS. or so, he finds himself a nice hide out, under, or behind some fallen log, or rock outcropping. There he just hangs out, usually only coming out to eat after dusk. This enhances his reputation as being a real challenge to catch. The drawing at right is what you fool 'um with.

WET FLY.... (Chief Needabeh)



The basis for all wet-fly patterns is the imitation of live natural food. This type of fly is most effective when fished as an emerging insect about to leave the water. Considered by experts to be the most effective patterns are those which closely imitate one of the life cycle stages of the Mayfly.

R. Cuny! 79

King Mac ATTACK!

By Chris Miller
Photos by the Author

As the first mate let the first line out behind the boat, I had my doubts about our success. When the right amount of line was out, he put the rod in a holder on the side of the boat and let another line go back. When it got to the right distance, he flipped the reel into gear and set it on the other side of the boat in a holder, and we all settled down as our day of trolling for king mackerel began.

Everyone on board was excited, but I had been listening on the marine radio on our way out and none of the other boats were having any luck so I knew we were in for a long and probably unsuccessful day. I settled down for a little snooze.

"Got him on!" yelled the mate, and I turned in time to see the port rod jerking wildly. Then the starboard rod started jerking too. Quickly the mate handed a rod to the man already in the fighting chair, and our first fish was on its way in.

This was no easy matter with the boat maintaining trolling speed, but in due course the planner came in, the mate grabbed the leader and, with an expert's touch, flipped a fish over the stern at our feet.

"Outstanding!" he grinned. "A bonito. Now we've got the best bait you can have for the rest of the day!"

But there was still another fish on, so he grabbed the other rod and handed it to the new man in the fighting chair. This took longer with a good bit more fight in the fish, but in due time I could see that beautiful flash of silver down in the depths that told of a good fish being brought up. Before long, mate Juddy grabbed the leader and heaved a beautiful king mackerel aboard!

I've been lucky early in a trip too many times for this to excite me, but I watched carefully as mate Juddy cut the skin off the bonito and threw the insides overboard to some lucky shark. He carefully cut the two halves of skin into strips about ¾ of an inch wide by six inches long; several of these were kept topside and the rest went into a cooler to stay fresh.

On each lure went a bonito strip. The skipper, Captain Ralph Vick, Jr., explained that no self-respecting king could let those strips go past him without hitting one of them.

Both lines went back out and settled down to trolling depth. Both crew and the charter group watched carefully for a couple of minutes, but the rods did not move so I smugly lit my pipe and got comfortable again for the long wait.

"Got him on!" the skipper yelled, and I turned in time to see a rod about to jump out of its holder. An eager fisherman was already in the chair and the battle was on again.

This day I was aboard "The Lucky Lady," a beautiful charter boat out of Hilton Head, South Carolina and we were about 45 miles due east in the Atlantic. Many people do not realize how good the fishing is in this Georgia-South Carolina area.

Early that morning before the charter group arrived, I was thinking that Captain Ralph seemed a bit young for this sleek craft out in the ocean. There were a few minutes to spare before we left and the captain said, "Come on, Chris. I'd like you to meet my Dad."

It turned out that the tall skipper of "The Waterway," a charter boat about four down from Ralph's, was Captain Ralph Vick, Sr. Captain Vick, Sr. has been the winner in several major billfish tournaments and is considered one of the top billfish skippers on the East Coast, I learned as I looked through his scrapbook of newspaper and magazine writeups. I began to understand how Ralph, Jr. had earned his command.

There are usually four or five charter boats out of Hilton Head every day and all of them are out of the Harbor Town Yacht Basin, in a beautiful setting of palm trees and sea gulls. Savannah, my home, about fifteen miles to the south, also has a couple of charter boats that go out regularly from a less country club-like setting. In this area of quiet southern charm, these boats are busy year-round taking natives and tourists out to fish in the deep blue water where pirates once sailed.

This is not an inexpensive way to fish. A full day's charter costs from about $250 to over $400 depending on the dock area and sleekness of the craft. Most boats carry up to six passengers to split up the expenses and fish caught. A new boat out of Savannah carries 40 people out to the Snapper Banks to bottom fish. This type of fishing is quite productive and much less expensive than hiring your own charter boat.

The lines were getting strikes quite regularly now so Captain Vick radioed out to a friend, "Pilot Boy, this is

Chris Miller is a photographer and freelance writer (as well as an avid fisherman and hunter) who lives in Savannah.

Bonito strips (near right) caught early in the day made fine bait for king mackerel. (Below) Bringing in a king. This charter group caught more than just mackerel, though— they even landed a barracuda. (Far right) Waiting for another strike aboard the Lucky Lady.

Lucky Lady. We're having a 'king mac attack' over here and I've got a marker buoy out if you'd like to head over to join us." I learned that it is common among the skippers to help each other out like this — it works to everyone's advantage.

Of course, not only his friend could hear that call, and in twenty minutes there were six smaller boats in addition to the "Pilot Boy." Imagine being 45 miles out in the Atlantic and having a traffic jam.

The white line flasher recorder on the bridge is the reason the Captain was so sure he was in the fish, I learned. He said that there were plenty of fish out there, but they stayed bunched up and were hard to find. When he finds a good spot he notes the location on his loran radio locators, then on future trips he can steam to the same spot to see if they are still there. These units will not make the fish bite for you, but they can sure save you some time fishing where there are no fish.

He explained as he pointed to the recorder, "We are in about a hundred feet of water over a fairly rough, rocky bottom. There - that gray mass is a school of bait fish and those curves under them are the kings."

"Got him on," yelled the mate and I began to realize that a logical combination of the right lure presented at the right depth in a spot where they knew fish were was paying off well.

The charter men were having a ball taking turns in the chair and everyone forgot who had caught what. Cold beer and thick sandwiches made the warm day, blue skies and smooth water seem even better. We were having a great day, and my camera was taking it all in. Some porpoises came by and put on an aerial show for us, so I put on another lens to photograph them. After one shot, someone yelled "Got him on!" and I turned the camera to the stern again.

Occasionally the other boats were close enough so I could tell that they were not having a good day except for the other charter boat which was doing ok. Why were we having such luck in the same area? I started to pay close attention to our methods and to theirs to spot any differences.

"Aren't you trolling a bit faster than they are?" I asked the captain.

Quickly he looked at me and then back again. "Maybe a little bit."

"Well, it looks like more than a little bit to me. Some of them are barely moving and we are cruising right along."

"In the open ocean these fish are fast. Trolling a bit faster than most people gives our lures a more natural appearance. These kings can still catch that lure if they want to with no problem."

Back down on the deck, I found mate Juddy and asked about the rigs he was using.

"I've got 4/0 reels onto these boat rods. We use forty-pound line to a planner," he said as he showed me a three by six inch model of a planner.

"The planner uses the motion of the boat to pull the lure down fast - the depth is determined by several things, but the amount of line out is the most important. I've got enough line out to troll about seventy-five feet or so.

"Then when a fish hits the lure, the planner will reverse and use the boat's motion to pull the fish up.

"I've got about thirty feet of thirty-pound leader out," he said. "Most people don't use that much, but I think it helps us catch more fish.

"Today we are using a six-inch spoon with a single hook and a blue and white lead body Sea Witch with a tandem hook arrangement. There are sharp 9/0 hooks and these lures seem to be working for now, but if we were not catching fish and other boats were, I'd change in a second. Hey! Got him on!"

A man quickly jumped in the fighting chair and started reeling in the fish—or at least tried to. This was harder than the other fish. Fighting against the fish and the speed of the boat, he couldn't keep the rod up so a friend came along to help him. The rod was still bent over and jerking wildly when I saw the planner splash to the top about fifty yards back. As it came closer I saw that beautiful flash of blue silver deep in the water that meant a great fish was fighting.

Soon there was a large splash on back and Juddy yelled, "A barracuda! And a nice one too!" Then the planner came over the stern, and soon Juddy deftly flipped the 'cuda over the stern toward our feet. One good look at those teeth and we cleared the deck in a hurry! I suspect by now that fish is on a den wall in Warner Robins, Georgia, the home of the charter group for the day.

Around the middle of the afternoon the action just seemed to stop. The smaller boats hadn't been catching fish to begin with, and now they dropped off one by one and headed west for home. Captain Ralph held his post and we continued to troll.

"They're down there", he scowled, "but they won't bite. We'll troll a bit longer and wait 'em out."

In the lull I talked with the men about the different types of saltwater fishing done in this area. There are basically four types for a fisherman depending on how far out in the ocean he wants to go.

The tidal creek and river fishing is excellent and very accessible to someone with a small boat. Flounder, sea bass, spotted trout, sheepshead and tohers are taken regularly, and the local fish camps with all facilities will be glad to direct you to a likely area. Many a shark is caught there off piers and from boats, too.

With a larger boat you might go 12 miles east of Savannah to "The Tower," a giant structure there to aid navigation. Trolling and bottom fishing there are quite successful.

An even larger boat will be interested in going 40 miles out to the Snapper Banks where the red snapper abound. You'll catch a mixed bag there, but that wonderful red snapper is what most people are looking for.

For the real adventure seeker, there is the Gulf Stream about 80 miles offshore with marlin and sailfish.

My specialty is shark fishing which is done best from April to September because of the warmer waters. Many people are now fishing for the small sharks, around five to seven feet weighing around 75 pounds, with tackle that is considered quite light. My favorite rig is loaded with twenty-pound line and a lot of it, but I've caught sharks four times that heavy with it.

After recently going over a world record book for fish, I am positive that there are world record sharks within ten miles of shore in the Savannah-Hilton Head area. Too many of the guys who fish with broomstciks for rods and use a thousand yards of hundred-pound test have told me, "I just couldn't stop him — he cleaned the reel out!" A serious effort directed toward huge sharks would have to hook into some good-sized creatures.

The Lucky Lady continued to troll that day — no fish for two hours. "We'll get them — just wait awhile," said the captain as he looked at the recorder, but everyone except me was inside having lunch.

"Got him on!" yelled Juddy at last and the men came pouring out of the cabin. I could just see the last small boat on the western horizon; that left the two charter boats alone.

In ten minutes another king was pulled aboard. Then the "Pilot Boy" had a hookup. We were back in business. The top came off the live well and stayed off.

The charter group men were jumping in and out of the fighting chair like school boys and reeling the fish in again. Later in the afternoon the strips of bonito began to run low, the group's energy was running low, and the sun was getting low; it was time to go home. The twin diesels were idled back while the buoy and all lines came in, then they were run up to a fast cruising speed back to Harbor Town.

For the relaxed two hour return trip, I climbed back up on the bridge with the skipper. "You've had a good day. Was it just luck?"

"It's always luck when you catch fish," he said. "We just try to do the right things in the right place that will put the odds in our favor. Today, and most days, it worked out okay, but some days nothing works."

"What do you do that most fishermen don't?" I asked.

"We just fish more seriously than most people do. And the white line recorder helps a lot — I don't understand why all medium size boats don't have one."

Back at the dock the captain and mate filleted the kings for the men who carried some ice chests and a garbage can full of fillets to a waiting truck. They had two barracuda, one small shark, the bonito, and *several* king mackerels. This day's fishing would be remembered long after the price of the charter would be forgotten.

A charter trip is not difficult to arrange. A call to the Harbor Town Yacht basin on Hilton Head Island at 1-803-671-2704 or to the Savannah Chamber of Commerce at 1-912-233-3067 can get you started on a place to stay and a charter boat. Or you can bring your own boat; there are plenty of private and public places to put in. ●

fishing on
Lake Tobesofkee

By Dick Davis

Dick Davis

"Brought in most of them on a four-inch green plastic worm," Bob Skinner said as he showed off the impressive array of pound-and-a-quarter-plus largemouth bass he and his family had boated in a few hours of fishing. Bob's young son could hardly hold up his end of the stringer of 23 bass totaling more than 33 pounds of good eating.

We had pulled alongside Bob's bass boat on Bibb County's Lake Tobesofkee on a sun-filled, picture-book day. The brilliant sun danced on Tobesofkee's waters, and along the shore dogwoods, redbud trees and variety of wildflowers were showing their colors. Even the bigmouth bass, crappie and cats seemed to know it was really spring and time for action — and they were doing their part.

"We couldn't ask for better conditions for bass fishing — these slightly stained waters are just right," explained Frank Patterson, Lake Tobesofkee's Assistant Director, as we pulled away from Bob's boat and out into the mid-channel of the lake to look for more anglers with good catches. We found them — in many of the coves and dips of the lake's shoreline. Crappie, bullheads and channel cats, hybrid bass, white bass and sunfish all share Tobesofkee's waters with the largemouth, and nearly all showed on weighty stringers.

A classic middle Georgia fun spot and fisherman's mecca, Lake Tobesofkee is a water sports outdoor recreation complex in the Macon-Bibb County area. The six-mile long lake with 1,750 acres of water, 35 miles of shoreline and 700 acres of adjoining parks shines like a jewel on the landscape.

Bank fishing seems to be just as popular as boat angling — or more so — at Lake Tobesofkee. This is a big plus and opens up a new dimension in outdoor recreation for those who do not own a boat. Angling from terra firma is especially convenient for many in the communities of Bibb County and surrounding counties who have only short periods to fish. With a few minutes on the road, they can bait a hook, wet a line and soon have some delicacies in the skillet.

A prime fishing spot at Tobesofkee is the "fingers section" at the upper end of the lake. The broad area consists of five sections of manmade canals interspersed with peninsulas or "fingers". Originally constructed as a waterfowl feeding and resting sanctuary, the canals afford excellent crappie, bass, cat and sunfish angling, are easily accessible by car or on foot, and are among the last spots in the lake to become stained during adverse weather.

Another popular and productive

Bill Bryant

Bill Bryant

spot for bank fishing is below the dam and spillway.

Camping, swimming, picnicking

Four separate parks, with beaches fronting on Lake Tobesofkee, are included in the recreation complex. Claystone Park and Sandy Beach Park are located on the north shore of the lake on Moseley-Dixon Road, off Highway 74. Flintrock Park and Arrowhead Park are on the south side of the lake, off U.S. Highway 80 and Highway 22. Claystone and Arrowhead parks have campsites for tents or recerational vehicles. These campsites are serviced with water, electricity, restrooms with showers and laundry facilities. Picnic tables and facilities abound throughout all the parks, and concession stands operate in all parks except Flintrock.

Each park has a white-sand beach with swimming in designated, protected areas. The parks have recreational facilities for all ages, including swings, slides and miniature golf. Sandy Beach Park has six modern, lighted tennis courts and a water slide.

There are paved boat launching areas on Lake Tobesofkee, located at three of the four parks. Eight ranges are at Claystone, six at Flintrock and five at Arrowhead.

Originally constructed to provide watersport, camping and outdoor recreation for the people of the Macon area and seven surrounding counties, the Tobesofkee recreation complex now attracts visitors from many parts of Georgia as well as from throughout the nation and Canada. "Metro-Atlantans fish Tobesofkee's productive waters in increasing numbers, campers and anglers journey to the strategically located and easily accessible lake from many parts of the state, and north and south travelers from Interstate Highway 75 use the campgrounds as a pleasurable stopover break in their journeys," says Clyde Walters, Tobesofkee's director.

Owned and operated by Bibb County, the recreation area has facilities to accommodate up to 10,000 persons per day, with modest user fees. The lake and receration area is open year-round, every day from 6:00 a.m. to 9:30 p.m.

What About Fishing?

Fisheries biologists of the Department of Natural Resources have studied Tobesofkee since its impoundment in 1969 for the purpose of managing the sport fish harvest for the optimum in fishing recreation and game fish production.

"Because of its fish population, the species present and the standing crop of fish, Tobesofkee is similar to other impoundments in the Southeast," says Les Ager, DNR fisheries biologist. "The lake is small compared to some others in Georgia and can be more easily worked and studied."

Tagging studies and creel surveys have been conducted by DNR biologists for the last two years to estimate the size of the population of various species and the mortality rate among the species. The total fish population is being studied.

In 1977 approximately 1,300 fish of all species were tagged and this year about 1000 were captured and tagged and returned to the water. Anglers are offered $3 for each tag returned. Of the fish tagged in 1977, 46 percent of the largemouth bass have been returned by fishermen, as have 36 percent of the crappie, 22 percent of the sunfish and eight percent of the catfish. In the first three weeks since the 1978 tagging was completed in March, 40 percent of the crappie tags and 18 percent of the largemouth bass tags were turned in by fishermen. The tagging and creel studies are planned through 1980.

The results of the creel surveys and the tagging studies show that in 1977 the approximate total harvest of fish at Tobesofkee was 11,000 largemouth bass, 5,000 crappie, 6,000 sunfish and 5,000 catfish. This is based on 83,000 hours of fishing on the lake during that year — about 50 hours of fishing per surface acre of water. Forty-five percent of the fishing on the lake last year was for largemouth bass.

What's the fishing outlook for Tobesofkee for this year and the next two or three years?

A Largemouth Lake

Les Ager says that studies indicate that a large proportion of the largemouth bass currently in Tobesofkee are the legal size of 12 inches or larger. He expects that fishing success through this year will continue good for largemouth and all species, but that the impact of depletion of the largemouth bass population due to poor spawns and/or survival in 1976 and 1977 will be felt by next year, adversely affecting the largemouth fishery at Tobesofkee by next spring. "But," Ager adds, "the decline of the legal-size bass population that is occuring and will continue to occur has stimulated the growth of fish of other species in the lake, and the harvest of these should substantially improve, thus maintaining a very good fishery overall but shifting the fishing pressure to species other than largemouth."

Crappie fishing, for example, has steadily improved in the last two years. The average size crappie in the creel study has been about ¾ of a pound, with single fish over two pounds not rare, and the numbers being caught have increased on the average.

White bass are showing signs of substantial improvement both in number and size. Fishing for this species is the best in three years, and this trend is expected to continue.

Hybrid bass — a cross between white bass and striped bass — is the only species stocked in Tobesofkee by the Fisheries Management biologists of the Game and Fish Division. These hybrids are expected to do increasingly better — increased numbers and accelerated growth — and in the years ahead should generate a good fishery.

Though Tobesofkee has never been known for outstanding bream fishing, biologists look for an increase in the average size of these species taken in the next two or three years.

As for catfish, Tobesofkee has always afforded good angling for bullheads or "speckled cats," as they are known to some, and this is expected to continue.

Overall, Lake Tobesofkee affords good natural habitat for its fish species, both in food and cover. Much of the upper end of the lake was impounded over standing timber.

The anticipated decrease in the largemouth bass fishery at Lake Tobesofkee next year is explained by Les Ager as resulting directly from the lack of good spawn and survival of largemouth in 1976 and 1977. Forage fish, primarily threadfin shad, were scarce during both years due to the unseasonably cold waters.

There was an excellent spawn and survival of largemouth at Tobesofkee in 1975, and this 1975 class of fish has been supporting the good bass fishery for the last two years. Most of the largemouth bass of the 1975 spawn are now believed to be over legal size — 12 inches or larger. "This year the largemouth bass fishing is excellent," Ager says, "with plenty 14-inches and larger, and fish of this species five pounds or more are more common now than in several years. We have tagged largemouth in excess of 10 pounds at Tobesofkee."

Fisheries management of Tobesofkee's waters in the years following the study's completion will be directed toward obtaining good spawns and survival in all years. Biologists have in mind several possible methods of doing this. One is through control of the lake's water level, especially raising the level at spawning time. Another method is through installation of better shoreline cover, possibly including special plantings. A third possible technique would be varying the legal size limit from year to year to protect certain size classes of fish. Les Ager emphasizes, however, that "a larger size limit than the legal 12 inches on largemouth in Tobesofkee would not have prevented next year's anticipated depletion of the population of this species."

Lake Tobesofkee, located almost in the Macon suburbs, is easily accessible from all directions. Visitors can reach the lake via Interstate 75 and Interstate 475, with exists marked and road signs leading directly to the park gates. From Thomaston and the west, Georgia Highway 74 leads to the lake vicinity. From Columbus, U.S. 80 carries the visitor near the lake.

Tobesofkee's waters beckon, the fishing is challenging and rewarding, the picnicking, camping, water skiing and swimming excellent, and the lake is easy to reach from most places in Georgia. Maybe you ought to go . . . real soon. ●

Illustration: Michael Nunn

The Old Ways of Fishing

by Michael Gillen

> One of our Indian young men, this evening, caught a very large salmon trout, weighing about fifteen pounds, which he presented to the colonel, who ordered it to be served up for supper. The Indian struck this fish, with a reed harpoon, pointed very sharp, barbed, and hardened by fire.

This is how William Bartram, writing in the late eighteenth century, described one old way of fishing on "a branch of the Broad River" in Georgia.

Spears, or "harpoons" as they were sometimes called, were a common means of fishing by Indians in this area. Adair, writing in 1775 has provided us with another good description of Indian spear fishing.

> Those Indians who are unacquainted with the use of barbed irons, are very expert in striking fish out of their canoes, with long sharp pointed green canes, which are well bearded, and hardened in the fire. In Savannah River, I have often accompanied them in killing sturgeons with those green swamp harpoons, and which they did with pleasure and ease; for, when we discovered the fish, we soon thrust into their bodies one of the harpoons.

The use of the word "gig" goes back many years and appears in this 1705 account of Indian spear fishing at night:

> They make a Hearth in the middle of their canoe, raising it within Two Inches of the Edge; upon this they lay their burning Light-Wood, split into small Shivers, each splinter whereof will blaze and burn end for end, like a Candle: 'tis one man's work to tend this Fire and keep it flaming. At each end of the canoe stands an Indian, with a gig, or pointed spear, setting the canoe forward with the Butt-end of the spear, as gently as he can, by that means stealing upon the fish, without any noise or disturbing of the water. Then they with great Dexterity, dart these spears into the fish, and so take 'em.

A Cherokee Indian named Swimmer is shown here with some of the methods of fishing commonly used by Indians: (clockwise from top) a deer horn fish hook; horse chestnut, one of the natural poisons used to temporarily stun fish so they can be easily gathered; spear fishing or harpooning.

Many of the Indians who lived in the area that was to become Georgia were expert fishermen whose methods were varied, ingenious and could be very efficient. A number of old ways of fishing known to Georgians well into this century, such as baskets, traps and trot lines, had actually been used and perfected by the Indian hundreds of years before.

The so-called "trot line" is an example of a simple invention whose design has not changed much since the original design. There were as many variations in Indian trot lines as there were in those used later on. Minor differences were determined by individual preferences in design, by the dimensions of the area they were to be used in, and by available materials. But they were all essentially the same.

The basic trot line consisted of one long line which was stretched out and anchored, in one fashion or another, at each end. Smaller lines with hooks were attached at regular intervals. A trot line could be as long as a creek or river was wide and was tied securely to a tree or some other fixed object on each side. Others were secured to submerged objects so as to avoid detection. Some Indians were known to space their trot lines between two grounded canoes.

The following eighteenth century description of an Indian trot line (here referred to as a "net") sounds much like those used long after the Indian had disappeared from along Georgia's rivers and creeks:

> These nets are really only about six fathoms (36 feet) long. A number of small lines are fastened to these a foot apart. At the end of each line is a fishhook where they put a little piece of hominy dough or a little piece of meat. With that they do not fail to take fishes weighing more than fifteen to twenty pounds.

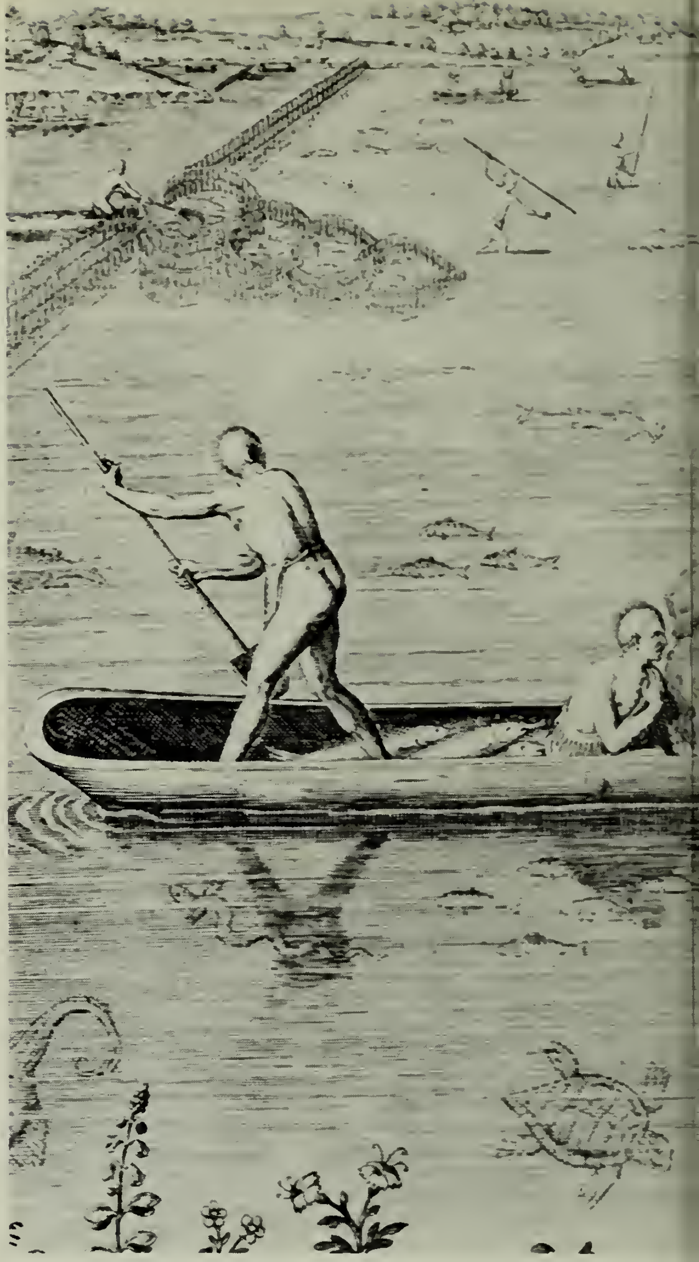
Just about the only difference between the trot line described above and one of more recent vintage, would be the size of the "fishes".

The Indian was good at fishing with no more than the good old hook and line. Hooks were fashioned from bone or wood or a combination of the two. Animal sinew was commonly used for line though other materials were used, including a type of bark.

One method of making hooks from bone and wood, used by Indians in the Florida area, might well have been used by Indians in Georgia, too. It was described in a 1902 publication by Cushing:

> The shanks or stems of these were about three inches long, shaped much like those of our own, but made from the conveniently carved main branches of the forked twigs of some tough springy kind of wood. These were cut off at the forks in such manner as to leave a portion of the stems to serve as butts, which were girdled and notched in, so that the sharp, barbed points of deer bone, which were about half as long as the shanks and leaned in towards them, could be firmly attached with sinew and black rubber-gum cement.

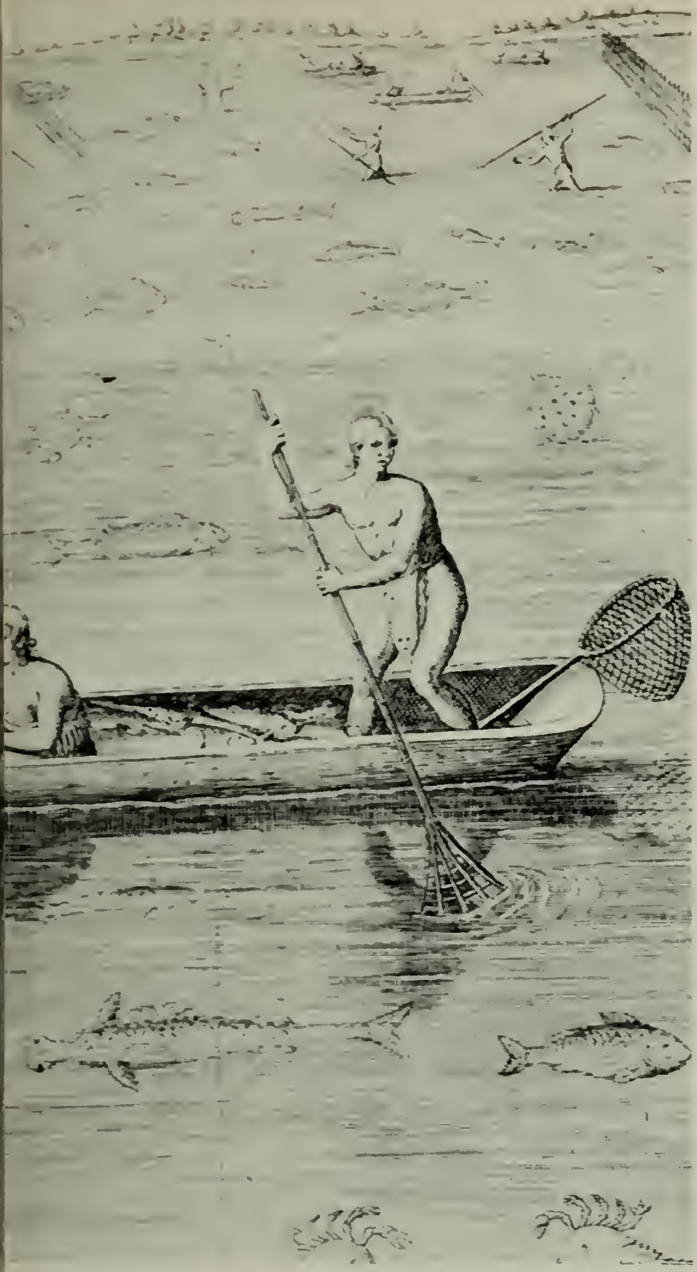
Some good examples of smaller, all-bone fish-hooks are on display at Ocmulgee Mounds National Monument in Macon, along with various stone sinkers also used by Indians in hook and line fishing.



The Indians were expert at making "baskets" for catching fish. This practice carried well into this century and eventually saw such materials as chicken wire and barrel wire incorporated into their construction. By and large, though, most baskets even of this century were made of various kinds of wood.

There were many variations in construction of fish baskets, both in size, material and the manner in which fish were removed from them. But, as with trot lines, they were all essentially the same. The following description of an Indian fish basket, from a 1909 publication, would also serve to describe baskets of other periods, both earlier and later:

> These were quite large, being ordinarily about three feet or more in diameter and from six to ten feet in length. They were cylindrical in shape, with one open end and an indented funnel-shaped passageway leading into the interior. The warp splints of



Engraving number 13 from DeBry, 1590.
New York Public Library

> this indenture ended in sharp points left free. As these pointed inward, they allowed the fish to pass readily in entering, but offered an obstruction to their exit. The other end . . . was closed up, but the covering could be removed to remove the contents. Willow sticks composed the warp standards, while the wicker filling was of shaved hickory splints. The trap was weighted down in the water and chunks of meat were put in for bait.

Pine and oak splits were also commonly used in their construction.

In comparison to the basket described above, many baskets had an inner as well as an outer muzzle leading to the interior. And many baskets were rigged up with small trap doors for placing the bait inside and for removing the catch.

The bait used in baskets was as varied as the baskets themselves. Bits of meat were commonly used, but bread and even such things as "may pops" ("passion flowers") have been known to meet with success. One old-time basket fisherman had a favorite bait mixture: corn meal, onions, and muscadines. He placed this concoction, or a variation of it, in a small bag in his baskets.

Fish baskets were sometimes referred to as "finger traps" because of the pointed, finger-like pieces that the funnel-shaped muzzles of the basket were made of.

An excellent example of a five foot long, all wood, double muzzle basket is on display in the Georgia State Museum in the Capitol Building in Atlanta. The label on it includes the words, "used during earlier hard times in Georgia."

The fishweir, or "trap" as it was commonly called, was one of the more efficient methods of catching fish. It consisted of some sort of a dam with several openings where box-shaped traps caught and held the fish. Some Indian fishweirs had cone-shaped traps, similar to the fish basket. The "dams" themselves actually allowed water to pass through, but fish could only pass through at the openings where the traps were placed.

Fishweir dams were often made of stones, but some Indian tribes were skilled at making fence-like dams out of reeds, small saplings and other material. One of the earliest descriptions of an Indian fishweir of this type is found in this account of 1562:

> (They were) built in the water with great reeds, so well and cunningly set together after the fashion of labyrinth, with many turns and crooks, which it was impossible to construct without much skill and industry.

Stone fishweirs were a common way of fishing by the Indians and later settlers and were still being used well into this century. The remains of some stone fishing dams are still visible along a number of Georgia's creeks and rivers.

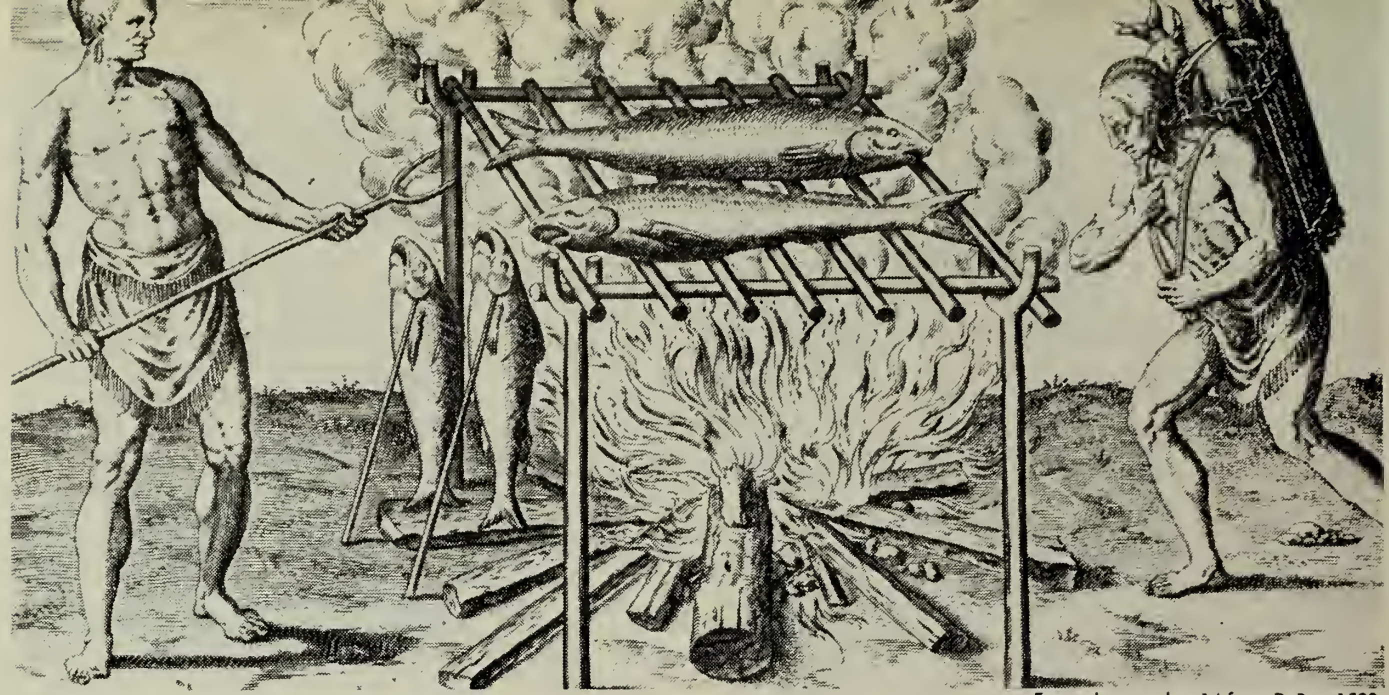
Some of the later fishweirs were constructed using logs secured to the riverbed with iron pins, behind which stones were piled. The logs were placed end to end, zigzagging across the river, with gaps for the boxes. The natural gaps in rock shoals were often taken advantage of with the boxes being placed in these areas; thus, the zigzag look to some fishweirs.

The opening of the traps, in any case, faced upstream so that the current would aid in moving the fish towards the traps and keeping them in. The boxes were normally weighted down with rocks.

What was probabbly the most efficient Indian method of fishing involved the use of a "V"-shaped dam with the point of the "V", the only opening, facing downstream. A large box would be placed at this opening, and a group of Indians would stand by to scoop the fish out. Another group of Indians, as this 1775 account describes, would go further upstream and would then

> fasten a wreath of long grape vines together, to reach across the river, with stones fastened at proper distances to rake the bottom; they will swim a mile with it whooping and plunging all the way, driving the fish before them . . . .

In this way, sometimes hundreds of fish could be driven



Engraving number 14 from DeBry, 1590. New Yark Public Library

through the opening of the "V" and into the trap. This method was especially effective in areas where shad made periodic journeys upriver. Dams would be built behind them and then fish would be driven down into the Indians' trap.

Various natural poisons were used in earlier times for catching fish. The Creek Indians who fished along the Chattahoochee River were known to use poisons, especially in the late summer when the river was low and fish became trapped in pools. At other times dams were constructed to make small ponds where poisons could be used.

This late eighteenth century account vividly describes the use of natural poisons for fishing in this area:

> In a dry summer season, they gather horse chestnuts, and different sorts of roots, which having pounded pretty fine, and steeped a while in a trough, they scatter this mixture over the surface of a middle-sized pond, and stir it about with poles, till the water is sufficiently impregnated with the intoxicating bittern. The fish are soon inebriated, and make to the surface of the water, with their bellies uppermost. The fishers gather them in baskets, and barbicue the largest, covering them carefully over at night to preserve them from the supposedly putrifying influence of the moon. It seems that fish catched in this manner are not poisoned, but only stupified; for they prove very wholesome food for us, who frequently use them. By experiments, when they are speedily moved into good water, they revive in a few minutes.

The Creek Indians were also known to use ground up buckeye and the roots of a plant called "devil's shoe string" to effectively stun fish. Alabama Indians called buckeye "ayona" and used it in this fashion. Both the small branches and the fruit of the buckeye plant were used. Other effective natural poisons included red willow and pokeweed roots.

Some Creek Indians performed a ceremony before using poison for fishing. They would rub on their faces a liquid made from whichever toxic plant they were going to use in fishing, and would then drink a small amount of it as well. They believed that, unless this were done, the fish would hide and could not be caught.

Of course there were other old methods of fishing, too many to cover in this article. Indians used bows and arrows with lines attached to them to catch fish. Various kinds of nets were also used by Indians, including a type made from "wathoo," which consisted of narrow strands of bark taken from elm trees.

Most of the old ways of fishing described in this article are no longer used in Georgia because they simply do not conform to present-day conservation practices. For the Indian whose survival depended on catching large quantities of fish, highly efficient methods had to be used. But fishermen were fewer then, and fish were more plentiful.

Clearly, the times have changed. We now know that without regulations and proper management it wouldn't take much for species of fish to be wiped out in just about any given area.

But we can "fish" for as much information on these and other old methods of fishing as we want to. For those readers interested in doing so, here's a partial list of sources consulted for this article:

—*Antiquities of the Southern Indians, Particularly of the Georgia Tribes* by Charles C. Jones, Jr. (1872).

—*The Indians of the Southeastern United States* by John R. Swanton (Smithsonian Institution Bureau of American Ethnology Bulletin 137, Washington 1946)

—*Fioneer Days Along the Ocmulgee* by Fussell Chalker (Carrollton, Georgia, 1970)

—*Travels Through North Carolina and South Carolina, Georgia, East and West Florida* by William Bartram (originally published in 1792—available in many later editions) ●

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SIMPLE SAFETY

E. BURCH ROBERTS

The next time you plan an outdoor trip, add a little safety insurance. Practicing precautionary measures while hunting, fishing, hiking or camping is not a costly venture and simple safety tips are easy to learn. Emergency situations can and do happen to both experienced and novice sportsmen. However, emergencies can be prevented by taking a few precautions before tackling the outdoors. By spending only a small amount of time and money, you can become adequately prepared to overcome most emergency situations that could occur while in the outdoors.

Getting lost is one of the most common outdoor emergencies. Each year many persons become disoriented, lose their way and suffer until they are located. It is this suffering that makes being lost so serious. The discomfort may be mental or physical and may occur in varying degrees.

Minor suffering such as embarrassment or insect bites are unpleasant but last only a short time. These situations usually only convince the victim to take precautions against getting lost on his next outdoor excursion.

Major suffering, on the other hand, is quite different. Not only must the discomfort of being lost be dealt with, but the mishap is also intensified. For example, physical injuries such as broken arms or legs which would normally require only routine medical attention may result in permanent impairment of the limb because treatment was delayed.

Since starvation and dehydration are rare occurrences in Georgia, mental anguish and other physical impairments are generally considered to be more commonly found among those who have been lost in wooded areas. The effects of such a frightening experience may continue even after the rescue. Major distress induced by being lost or by accidents occurring while lost out of doors may cause the victim to strongly reject the idea of ever entering a wilderness area again.

To avoid getting lost in a wooded area, initial precautions should be taken. You should be familiar with the geographical arrangement of the area. Such knowledge is easily obtained through maps of varying detail. Then, after getting the "lay of the land" fixed in mind, you should get a compass and use it.

Perhaps the most dangerous threat

to Georgians who are lost outdoors is hypothermia. Hypothermia results from a subnormal lowering of the body's temperature. The lowering is usually caused by exposure to elements like wind, rain, and cold. If the body temperature falls to 78 degrees, twenty degrees below the normal body temperature, the victim can fall into a stupor. If the body heat is not raised immediately, coma and death could follow.

While hypothermia occurs more often in colder regions, it is an underestimated danger for the southern sportsman as well. Unbelievably, hypothermia can strike when the temperature is as warm as fifty degrees Fahrenheit.

Hypothermia is easily developed after getting wet from the rain, falling into a lake or river, from excess perspiration, or from not being able to locate shelter out of the wind.

Finding shelter from the wind is very important since wind chill is a major cause of hypothermia. Moving air draws heat from the body. For example, a twenty mile per hour wind can make fifty degree weather feel like thirty-two degrees. If the victim is wet, the cooling effects are magnified. It should be noted that a twenty mile per hour wind is really only a strong breeze.

Hypothermia may not be immediately detected since it develops slowly. This is why it is necessary to know the symptoms. At first, the victim will feel cold. This coldness will grow steadily into numbness. Other symptoms follow: irrational actions, generally progressing to the loss of control of the arms or legs, and then stupor or a lack of awareness.

However, with only a small amount of preventive action the effects of hypothermia can be nullified. Since hypothermia results from the body's exposure to the weather, the first precaution to take against this condition is to locate shelter. A cave, fallen tree, lean-to or any object that will reduce the effects of the wind and keep you dry should be adequate.

A second precaution against hypothermia is to get warm. This is especially true if you are not moving or

cannot move as non-mobility requires added warmth for survival. A fire is perhaps the fastest way to supply heat; therefore, matches are needed for building a fire unless you are especially proficient at rubbing two sticks together. And even then, a match is usually faster.

To be useful matches must be strikable. Therefore, they should be kept in a waterproof container. A good match holder is a plastic 35mm film can. These "cans" are small, light and, most importantly, waterproof. They will hold 25 strike anywhere matches and the side panel from the match box in case a dry rock can't be found to use for striking. Also, if the kindling wood is too wet to burn, the film can may be slit up its sides and set on the fire as a fire starter. After filling the can with matches, leave enough space to include a long shoe string which can be used as a tourniquet or simply as a replacement for a broken lace.

In addition to warmth, a fire will also serve as a beacon useful in signaling for assistance if it is needed. Shelter and warmth will usually serve as adequate protection from hypothermia. Therefore, when you are outdoors and feel yourself getting uncomfortably cold, find shelter and light a fire regardless of the temperature.

If there is one item that is an outdoor necessity, it is a knife. The type or size of knife isn't important as long as it has at least one sharp blade. It can be used for shaving splinters from sticks for starting fires or for cutting brush to make shelters, crutches, or splints.

When going outdoors in Georgia you need to be aware of the possi-

Bob Bu

bility of being snake bitten. Four species of venomous snake are found in Georgia. The best precaution to take against snake bite is to be alert. Watch where you walk, climb or sit, and be especially careful where you place your hands and feet.

You should remember that snakes are cold-blooded creatures and need warmth and shelter; therefore they are often found near rocks and logs. When danger or the elements threaten, they quickly retreat to find shelter.

The safest way to avoid an unfriendly reptile is to use extreme caution when turning over rocks or logs. Also, do not reach blindly into shallow caves or holes without first checking to see what is there. When climbing or hiking in hilly areas do not reach or pull yourself up or onto a rock or bank that shields anything lying on top. This is especially true on hills with a southern exposure, particularly in the early spring or fall since such places are favored den areas. When approaching a high bank or large rock, toss a few pebbles up first. This will usually cause any snakes resting there to crawl away making it safe for you to continue your climb.

In addition to being alert, a snake bite kit is always a useful item to include on a trip. There are several types available ranging from kits containing an injectable anti-venin to the older varieties where you tie off and cut the area, then remove the venom with a suction device. Each kit has directions included. However, the best piece of advice to remember when dealing with snake bites is to tie a constricting band, not a tourniquet, between the bite and the heart. Then, get to a doctor as quickly as possible. Placing a cold pack on the bite will also help to slow the spread of the venom until medical help can be found. Know how to describe the snake that bit you. You will surely be asked this when you reach the hospital.

Locating a doctor is preferred to using a snake bite kit in the field. Only one person died of snake bite in the U.S. last year, but many individuals lost the use of their fingers and toes because tendons and blood vessels were cut when using snake bite kits. The time involved would determine the action you take, however.

A knowledge of basic first aid is always useful for anyone who roams the outdoors. Although a first aid course will require more time on your part than any of the other insurance factors mentioned, the time and effort spent will be valuable if you should ever need it. The Red Cross and other community organizations in all cities offer these courses several times each year. Contact them for further information.

The last precaution to take is perhaps the simplest and possibly the most useful tip for outdoor safety: leave with someone at home information about where you are going, what route or trail you are traveling, and when and where you expect to arrive after your outing. This is important since any delay in your return usually signals that assistance is needed and could make a big difference in the event of an emergency.

These precautions are only simple steps for aiding in basic outdoor emergencies. They will not work miracles and are not intended to do so. Emergencies that arise in the outdoors will rarely be as simple or as easy to solve as those outlined here. These precautions are only an effort to present low-cost, but necessary ideas for insuring a safer and happier outdoor trip. ●

Burch Roberts is a freelance writer and photographer. A native Georgian, he goes hunting, fishing and camping as often as possible, especially on the coast.

The Perversity of Fishing

By Gib Johnston
Photos by Ed Brock

I like fishing. I don't really know why because I never do well at it. My son, Gip, however, is a different breed. He fishes hard and long and will outdo me with a rod and reel any day of the week. He catches fish when no one else does. He fishes when no one else does, which could explain his uncanny success.

When my friend Dennis Livingston asked us to meet him in Monroe County last year when the white bass were running and said we would catch fish until our arms ached, I waited anxiously for the phone call. At last, I thought, this will be my big opportunity to do at least as well as my son. Surely he wouldn't embarrass me this time.

The call finally came and we lit out before daylight and were on the scene about sunrise, ready to load up with white bass. WHITE BASS? As a boy in South Georgia I had caught largemouth bass (better known there as trout) and had heard of smallmouth, spotted, striped, redeye, coosa and channel bass, but what is a white bass? It took on the aura of some strange, foreign thing. We'll catch some, I thought, and find out more about them later.

The white bass fishing that Dennis so highly touted was not all he said it would be. My arms didn't ache at all; in fact, true to form, my son caught the only fish taken that day, a nice redeye bass. We didn't see even the slightest hint of the whites. We fished hard all day; the fish just weren't there.

We speculated long and loud about the situation. "They should be here." Maybe it's the weather (it was beautiful); maybe the phase of the moon (it was right for fishing); or the unusual winter (miserable but over); the spawning run was early (or maybe late); our lures were wrong (we had one of every kind known to man). No one could come up with a satisfactory answer except the universal perversity of fish. The curious thing was that Dennis' enthusiasm about white bass fishing was not changed in the least by this day. "It's still the best catching fish around."

There's no way that a day's fishing with my son and good friends is wasted time and we all vowed to try again . . . soon.

In the meantime, I determined to find out what I could about the white bass.

Another friend of mine, Leon Kirkland, now director of Game and Fish Division, who is never accused of not knowing what there is to be known about Georgia fish and fishing, told me that the white bass *(Roccus chrysops)* is not a native Georgia fish. Until 1958 it was found only in Goat Rock Lake and a few in Lake Allatoona. No one knows how these got in Goat Rock Lake because this fish is native to the Mississippi drainage. All those in Georgia, then as now, come from introduced populations. All Georgia fish come from the population established in Goat Rock sometime before 1958.

From 1958-61, most of the large reservoirs were stocked with white bass taken during the fabled spring spawning run and were caught with hook and line. These fish bite so readily that this was the most efficient method and much less time consuming than nets. (It was probably more fun, too.) For five days each spring during the stocking period, Leon and another biologist would catch 80-120 fish per day by this method plus others in nets.

If these few fish seem inadequate for a major stocking program, consider this: a female white bass will lay from 250,000 to 1 million eggs. At that rate, a few is enough. Only a small percent of these survive the first year, but a small percent of about 500 fish multiplied by 1,000,000 eggs each is a lot of fish.

White bass abound in the reservoirs in Georgia and can be taken year-round. The best fishing is a toss-up between the spring runs and those summer days when the lakes are "slick water" which suddenly begins to boil as a school of whites begins to feed on forage fish, shad, that frantically leap from the water to avoid the voracious whites. It's a sight to behold: schools of shad being chased by schools of white bass being followed by flocks of gulls being followed by hoards of fishermen.

These activity peaks have given the white bass the reputation of a bite-almost-anything fish. A cast with a Shyster, Rooster-tail, Beetle-spin, Mepps, doll-fly or any other small to medium jig, spinner or spoon (of any color) is supposed to produce a fish. And I'm told that for real excitement, a double-rigged jig with one tied about 18 inches above the other, often produces doubles—two fish on one cast.

Any medium size rod and reel will do, and top rate fun comes with one of the ultra-light outfits.

The average size white bass in Georgia will run about 3/4 to 1-1/2 pounds, and anything over two pounds is a "real good fish." A three pounder will get certified in the Big Fish Contest; four pounds will probably be mounted for the den wall; and five pounds, three ounces would be a new Georgia record; five pounds, six ounces, a new world record. That's the one Gip is after, and I wouldn't dare bet against him.

The white bass is the only temperate bass (or true bass) found in Georgia's fresh water. (Our black basses are in the sunfish family.) They fortunately have the characteristics of their ocean kin of schooling and moving upstream to spawn.

This fish does best in Georgia in the reservoirs of 200 acres plus, and they usually spawn in areas of two to 12 feet deep with sandy or rocky bottoms.

In the spring, when the water reaches 55 to 60° F, the males begin to move up the larger streams to the first impassable barrier or shoal area that concentrates fish and wait for the arrival of the females who show up about a week later. Spawning begins and this piscatorial orgy continues off and on for three to four weeks for as more females arrive to spawn, others return to big water.

The eggs are fertilized as they leave the female's body. They settle into the gravel or sand on the bottom to hatch. Two to four days later the young, true to their kind, form massive schools and spend their time seeking food and a place to hide from larger predators. As they grow, their food changes from minute zooplanckton to crustaceans and insects and then to larger insects, crustaceans and small fish, and places to hide become less and less imperative, for they themselves become predators.

Those that survive the first summer are six to eight inches long; then growth slows with colder fall and winter waters. The second year will produce growth to 12 inches or so, and maturity comes soon after this second year. The whites don't usually live longer than five or six years.

I found out that the male white bass and the female striped bass are the unwitting parents of the newest game fish in Georgia, the hybrid bass. This fish, like the mule, is a product of man's manipulation and, like the mule, is in many ways superior to either of his parents but cannot reproduce his own kind. This superiority includes the voracious feeding habits of his white bass daddy and something approaching the size of his striped bass mama which equals a first class sport fish.

The best place to catch a mess of white bass during the spring run is in any of the larger streams above the reservoirs. Sinclair has the oldest population (after Goat Rock), but the state record fish came from Lanier. Take a hint from the fish and move upstream to the first good obstruction, be it dam, shoals or falls. That's the place in April. In the summer, wait for the slick water and watch for the schools. In the fall, white bass often school around bridges.

Being more specific about places to fish would bring more abuse than I'm willing to put up with. Dennis, Gip and I have our place staked out and we're waiting for that phone call. We'll catch a real mess—and maybe I won't let my boy embarrass me this time. ●

TO TEMPT A TROUT

"To Tempt a Trout," a new Department of Natural Resources film, shares the thrill and excitement of fishing for trout in north Georgia. From bait fishing to fly tying, this 20-minute film explores the many tricks and techniques of outsmarting a wily trout.

"To Tempt a Trout" features unusual underwater footage of the fish in their natural environment. And through interviews with experienced anglers, it examines the joys of fishing in these unspoiled mountain streams.

Trout fishing long has been a way of life in the north Georgia mountains. Through a variety of management techniques on rivers and creeks, the Department of Natural Resources is preserving, and often improving, this tradition. "To Tempt a Trout" investigates DNR's programs to stock rivers and streams with both native and hatchery-reared fish. And it takes a look at Waters Creek, Georgia's only trophy trout stream, where the minimum size limit for most fish is 22". "To Tempt a Trout" examines the special habitat that trout require, and it explores unwise development practices that cause the destruction of this habitat.

For the inexperienced fisherman, "To Tempt a Trout" offers a solid introduction to the pleasures of trout fishing. And for the veteran angler, the film provides a refreshing look at his exciting sport. "To Tempt a Trout" is available on a free-loan basis from the Department of Natural Resources, Room 719, 270 Washington St. SW, Atlanta, GA 30334. (404) 656-3530.

A new film from D.N.R.

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Outdoor Commentary

Variety Is the Spice...

We got a letter from a man the other day, a subscriber who just wanted to tell us that he really enjoyed reading our magazine because of the variety of information in it. Seems he'd been a subscriber since *Georgia Game & Fish* days and, though he thought he'd never say it, being a dedicated sportsman and all that, he really liked to read about rocks and history, plants and people and all that *OIG* offers almost as much as he likes reading hunting and fishing stories.

This fellow went on to say that he particularly enjoyed Lucy Justus' story on rice culture in coastal Georgia in February's issue (I can't agree more; it was one of my favorites, too) and "Thin Sections" and "Lighthouses" in January. He closed by saying that he just thought we'd just like to know and to "keep up the good work."

Well, Mr. Loyal Subscriber, we do like to hear from you and hope you know we are sincerely trying to keep up the work, and we're glad you think it's good.

What we've got for you this month should present at least something for everyone. It's a real amalgamation. We've got articles on natural resources management, we bring you some history, a smattering of information for the fishermen and something about some very famous Georgians you might enjoy knowing about.

In the famous person category, we introduce you to a military master, one General Courtney Hodges, born and raised in Perry, Georgia. Though not as flamboyant as George Patton, General Hodges ranked right up there in military circles with General Patton and Omar Bradley. We thank Mrs. Courtney Hodges for her gracious assistance with this story, written by DNR resident military buff and historian, Billy Townsend.

Bob Jones, a more-well-known famous Georgian, was a master in an entirely different field, the game of golf. A life-long Atlanta resident, Bobby Jones was a golfing legend who will forever be idolized by golfers everywhere. Part of his appeal, part of his greatness, was earned not only because of his skillful execution of golf shots but also because of his ever-strong sense of priorities. Read about him in "The Emperor of Golf."

Anyone who knows a driver from a seven-iron knows that you cannot think of Bobby Jones without thinking, in the same instant, of The Masters Golf Tournament. The Masters, a little get-together held every April over in Augusta, is *only* one of the four most prestigious golf tournaments in the entire world. The Masters brings together some of our most valuable resources: the unsurpassable beauty of our glistening, color-splashed spring; the friendliness and gentility for which the South is still famous; careful attention to nature; tradition that seems to always border on reverence. No one has written more eloquently about The Masters than Furman Bisher in his book *Augusta Revisited: The Masters, An Intimate View,* and we hope you'll enjoy these excerpts of Bisher's magnolia magic.

But The Masters isn't the only professional golf tournament in this state—there are three others you might like to know about. (See page 11.) Even if you're not a golfer, though thousands of you are, you'll have to admit that this is one outdoor activity or sport that's not at odds with nature. Wide open, green spaces, peace and quiet punctuated only by singing of birds, lapping of water and distant laughter of enjoyment (forget the gnashing of teeth)—who could find fault with a game in which nature is a most important partner?

Another form of natural resources management, though quite different, is occurring on Ossabaw Island, now a heritage preserve owned by the state. In many ways, Ossabaw Island is like a gem in the rough: though its worth is still unknown, it has an intriguing sparkle. Yet in this case, the value lies in keeping it uncut because to try to alter its state could mean destruction. Learn why when Lucy Justus tells you about "Preserving an Island: Ossabaw."

To see what happens when valuable habitat is not preserved and when nature's balance is tampered with, read about the eastern bluebird, now an endangered species. In the other part of our continuing series on Georgia's protected species, you'll be reading about the protected and endangered plants that occur in the granite outcrop areas of the Piedmont.

And for you fishermen who are planning to catch a real trophy this year, don't forget about the Big Fish Contest. Next year, you might be a winner like 10-year-old Link Henderson of Griffin whose prize-winning catch in 1978 was a 10 pound, 2-1/3 ounce largemouth bass.

There's something for everyone this month, and we hope you enjoy it.

Susan Hood

Gen. Courtney Hodges:

Precision Puncher

Remagen Bridge · Aachen · Bastogne · Battle of the Bulge · St. Lo · Huertgen Forest · Saint Mihiel · Normandy

All these places that bring memories of blood and victory have one common strand. The presence of a reticent, purely professional soldier, born in Perry, Georgia.

When the Georgia legislature was considering honoring General Courtney Hodges by naming a new administrative building at Georgia Veterans Memorial State Park for him, I was asked to briefly research General Hodges' life. As a military history buff, I was familiar with the name but not the person. I checked general sources and was surprised by the lack of material.

The *Dictionary of American Biography*—nothing. *Who's Who* (1945)—nothing. *Books In Print*—no biographies. Georgia Department of Archives and History—one small clipping. Slowly the general sources yielded some material. *Who Was Who* had three column inches. *The Encyclopedia Americana* had several column inches. The last source named gave me the facts to guide my research plus gave an indication of why there was little material around.

Courtney Hodges lacked the personal color, eccentricity or flamboyance necessary to make good copy. His brilliant First Army was flanked on the right by George S. (Blood and Guts) Patton and on the left by Field Marshal Bernard L. Montgomery. In the First Army drive across France, Belgium and Germany, his three army corps equaled or bettered the accomplishments of others but the Press Corps did little to make him a lasting household name. What was this man like? How did he accomplish all he did? These were questions I had to answer. There were few answers in the retrospective writing so I delved into the W.W.II periodicals.

Time, Newsweek, Collier's and *The New Yorker* covered Hodges. The cover story from *Time* entitled, "Precise Puncher" began to build the skeleton, other articles filled in the muscles, and Volume II of the *West Point Atlas of American Wars* added the brains to the image of a man who certainly never pushed himself into print.

Hodges was born in Perry, Georgia on January 5, 1887. The son of the editor of the *Houston Home Journal* grew up in Perry and showed an early interest in the military. He joined the Perry Rifles, a local militia unit, and upon finishing high school, attended North Georgia College for one year. In 1904, Hodges entered the U.S. Military Academy at West Point. His career at West Point was all too brief. Hodges failed geometry and left after one year. The next seven months clerking in a grocery store in Perry was all Hodges could stand. He could fight his inclination no longer.

He joined the U.S. Army at Fort McPherson as an enlisted man and served in the Army for the next 43 years. In these 43 years, Hodges held every rank in the Army except one, that of a five star general. Hodges quickly moved up the ranks in the 17th Infantry Regiment. Sergeant Hodges won the competitive examination for a commission and made lieutenant only one year after his West Point classmates. Hodges was assigned to the punitive expedition against Pancho Villa in Mexico and served with "Blackjack" Pershing in 1916.

Three years later he was once again serving under Pershing, but it was in a little more significant campaign, World War I. Hodges entered France as a captain and left with the temporary rank of lieutenant colonel. He proved his personal courage and tenacity at the crossing

By Billy Townsend
Interpretive Specialist

of the Meuse River. Major Hodges took two companies to verify that the Germans had retreated. They had not. Hodges' command was pinned down all day, but they hung on to the bridgehead and became the spearhead for his entire brigade in the Meuse-Argonne offensive. This "first" won him the Distinguished Service Cross and was only one of the many "firsts" to Hodges' credit. Soon afterward, Hodges won the Silver Star for gallantry in the Saint Mihiel Offensive.

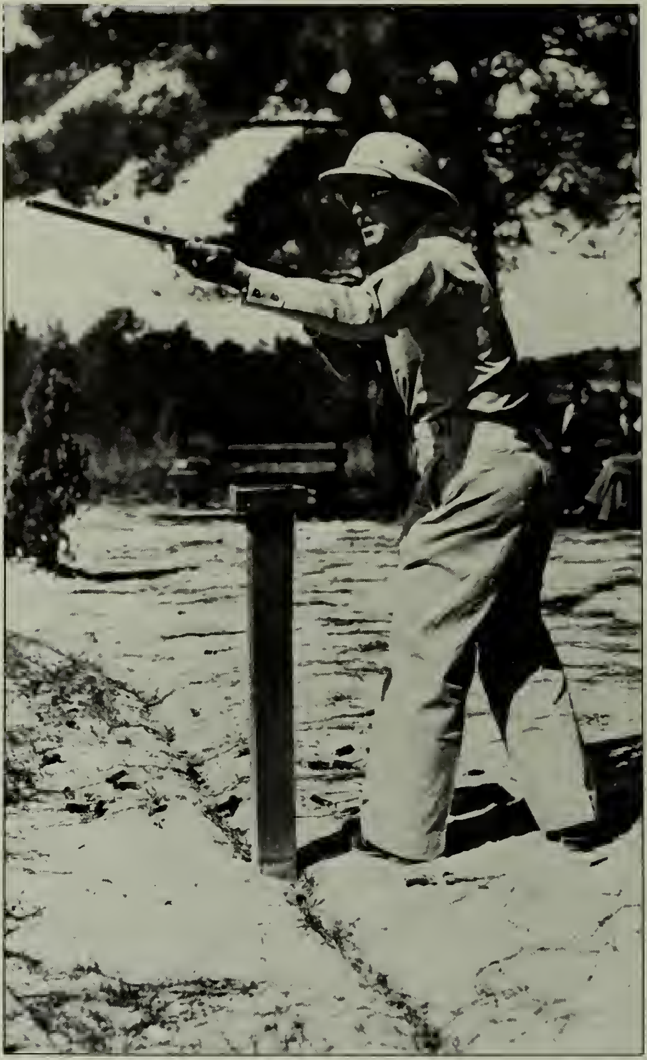
With the end of W.W. I the Army was reduced in size and Hodges was reduced in rank to major, a rank he held for the next 14 years. The between-war-years were not wasted for Courtney Hodges. He was sharpening the skills that a modern army commander would need. He graduated from the Field Artillery School in 1920 and the War College in 1934. He also worked with the Army Air Corps to develop combined air-infantry tactics.

Even Hodges' hobby was closely related to the military. He was an avid hunter and an expert skeet shooter and rifle shot. He captained the infantry team at the national matches at Camp Perry, Ohio twice during this period.

During these peace-time years, Hodges scored his second "first." He was the first non-West Pointer to teach infantry tactics at West Point. In the closeknit world of the upper echelons of the small Army, Hodges worked with and under some people who would help him shape the modern world. In 1929 Hodges and another young major named Omar Bradley impressed Lt. Colonel George Catlett Marshall with their work at the Infantry School. In 1936 while serving as General Douglas MacArthur's Plans and Operations Officer in the Philippines, he came to the attention of Lt. Colonel Dwight David Eisenhower.

Two years later, Colonel Hodges got another big break. He was made assistant commander of the Infantry School at Fort Benning; soon after, he was made commandant. In 1941, in the greatly enlarged Army, Hodges was made Chief of Infantry and promoted to major general. As Chief of Infantry, he was interested in all aspects of the infantry in an army that was as rapidly changing as the military technology. Hodges wanted the infantryman to remain "the queen of the battle," so he helped shape infantry technology and tactics. He pushed for the bazooka because he felt an infantryman should be able to stop a tank. He urged the adoption of the new style helmet to better protect his men. Hodges pushed the jeep and the semi-automatic carbine both of which became tremendously popular. In the complex and diversified field of tactics, Hodges helped develop the close coordination of artillery and formulated the infantry doctrine which incorporated the use of airborne troops.

During the first two years of W.W. II, Hodges was busy building America's largest Army and building it well. As the Army went to the battlefields of the world, more field commanders were needed. Now Chief of Staff, George C. Marshall remembered Courtney Hodges and made him commander of the Third Army during the giant Louisiana maneuvers of 1943. Hodges proved he was more than a superb training officer and desk general. Marshall declared him "unbeatable in the kind of command that requires deliberate method, close-knit organization, the kind of mind that nothing can distract." He was made deputy commander of the First Army under General Omar Bradley and sent to England to help prepare for the invasion of Europe.


Courtesy Mrs. Courtney Hodges

General Hodges had spent his entire adult life preparing for this moment. He was a thorough professional—a scientist of warfare. He was the kind of man that is never heard of in peace but is prayed for in war. Hodges looked like a businessman and ran things that way. He was calm, sometimes even aloof. His temper was controlled, and he was not profane. He was quietly firm but could be ruthless when it came to sacking poorly performing subordinates. Hodges did not have the dogged look of Bradley, the flair of George Patton or the eccentricity of Bernard Montgomery. He did not appear on the front pages of newspapers but the soldiers of the First Army came to know and trust him.

This First Army was part of the largest amphibious landing the world has ever seen. The First landed at

U.S. Army Photos

(Opposite page) Hodges shooting skeet on the "Hook Range" at Ft. Benning, Georgia, 1938.

(This page, top photo) Aachen, Germany. Aided by the armored force, Co. M, 26th Infantry Regiment, moves to engage the enemy in Aachen.

(Bottom photo) Pushing through Huertgen Forest near Vossenack, Germany.

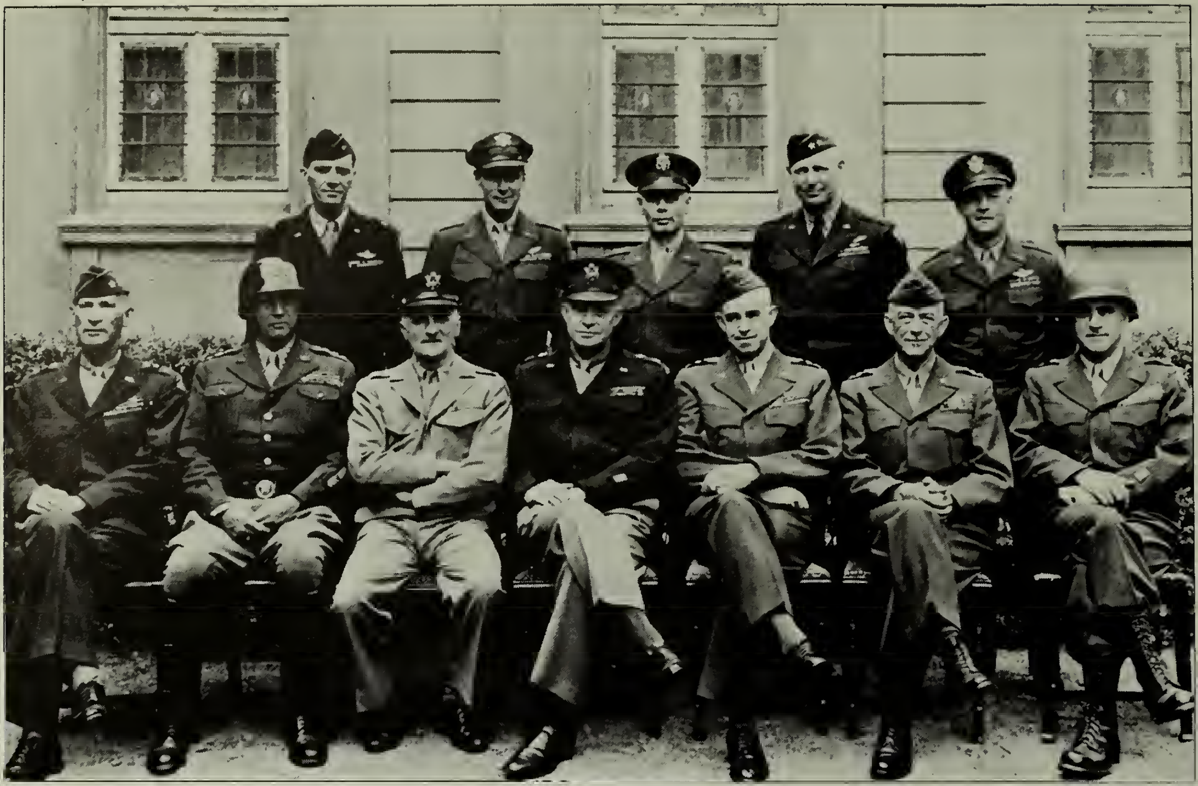
Omaha and Utah beaches and went on to capture Cherbourg, the first major European seaport. The First Army pushed through the hedgerows until they smashed through at St. Lo. The newly arrived Third Army under General Patton zipped through this break and started pushing eastward. The First kept pace with the Third, but now they had a new commander. When Bradley took charge of the 12th Army Group (First and Third Armies), Courtney Hodges became the new commander. This army consisted of eight combat divisions and three mechanized cavalry groups. It included nine tank battalions, 12 tank destroyer battalions, 46 field artillery battalions plus engineers, anti-aircraft, chemical, quartermaster, transportation, ordnance and medical units. Its number reached 250,000 men—men to feed, clothe, arm, supply and fight.

Hodges' First became the southern pincer that closed on the Falaise-Argentan pocket. In this action 10,000 Germans were killed and 50,000 were captured. Hodges did not slow down. The First moved eastward then northward and captured 25,000 prisoners at Mons. The 12th Army Group was ordered to break through Germany's West Wall or Seigfried Line. The First Army that had been first through Paris was first through the famed "dragon teeth" of the West Wall. After breaking through near Aachen on October 13, Hodges faced a beautiful forest section called the Huertgen. Here for weeks the First fought a deadly battle of attrition where foxholes did not protect from shells exploding in the treetops. Hodges finally cleared the Huertgen Forest and prepared to capture the Roer River Dams that could floor and cut off all advances to the north.

Before the Roer offensive could begin, the Germans had their own ideas. In a "quiet" sector in the Ardennes Forest, Hitler personally ordered an attack designed to cut the Allied Forces in two. The Germans struck along most of the First Army line and pushed it back to form a huge bulge that gave the battle its popular name. The 2nd Armored Division finally stopped the advancing 2nd Panzer Division, and by January 24, 1945, the Bulge had been reduced by the pounding of the First Army on the north and the Third from the south.

By February the counterattacks had penetrated the West Wall at Prum and Germund, then preparations began to capture the Rhineland. On March 7, leading units of Hodges' 9th Armored Division captured the Ludendorff railroad bridge at Remagen and became the first allied unit to cross the Rhine. During this Rhineland

U.S. Army Photo



May 11, 1945. Front row, left to right: Lt. Gen. William H. Simpson, Gen. George S. Patton, Jr., Gen. Carl A. Spaatz, Gen. Dwight D. Eisenhower, Gen. Omar N. Bradley, Gen. Courtney Hodges, Lt. Gen. Leonard T. Gerow. Standing, left to right: Brig. Gen. Ralph F. Stearley, Lt. Gen. Hoyt S. Vandenburg, Lt. Gen. Walter B. Smith, Maj. Gen. Otto P. Weiland, and Brig. Gen. Richard E. Nugent.

Campaign, the First captured 95,000 prisoners.

The next job for the First was to act as the southern pincer to enclose the Ruhr Pocket. When the First closed with the Ninth Army, it enclosed Model's Army Group B with some 350,000 troops. On April 18, 317,000 of these surrendered to the First and Ninth Armies. When the First again moved westward, it pocketed the entire German Eleventh Army in the Harz Mountains and captured it on April 12, 1945.

Four days later the First Army met a Russian detachment on the Mulde River to join the Eastern and Western Fronts. Since landing on June 6, 1944 the First had fought through more than 500 miles of contested territory across three countries. On May 8, Germany surrendered, but the First was not rejoicing as much as others were. On May 1, Hodges had learned that his Army was being transferred to the Pacific. The plans for the invasion of Japan's home islands included the First. Operation "Coronet" which was scheduled for 1946 included the First Army as the floating reserve with a landing on Houshu near Tokyo. Thankfully, the Japanese surrendered in August 1945, and the invasion did not have to take place.

Allied Supreme Commander Eisenhower assessed Hodges in a report to his boss, Chief of Staff George C. Marshall: " . . . his drive, clearheaded thinking and tactical skill have shown even more brightly than they did in his pursuit across France, in which First Army's part was the most difficult given to any United States formation but brilliantly and speedily executed . . . ." Eisenhower was not through. He went on to say Hodges was the "scintillating star" of his command.

Hodges went on to the Pacific where he witnessed the Japanese surrender from the decks of the Battleship *Missouri.* He returned to the U.S. where he remained commanding general of the First Army until he retired in 1949. In 1950 Hodges came out of retirement briefly to serve as a United Nations military adviser in Kashmir. Until his death in 1966, Hodges lived quietly in San Antonio, Texas. He worked in his garden, hunted, fished and read. In 1958 he was asked about the space age military. He answered, "Everyone has his opinion but one not in close touch should not sound off." Hodges had not changed. He was just as reticent as ever. Like MacArthur had stated of himself, Hodges was an old soldier fading away.

General Hodges received a hero's welcome in Atlanta and in Perry in May 1945. He probably appreciated more the two steaks that a First Army soldier's father gave his Atlanta-based wife during those meat-scarce days for his first home dinner in 15 months. Hodges was not forgotten in Atlanta. The report of his death was on the front page of the *Atlanta Constitution* in January, 1966. Strong memories linger on in the minds of the generation of the news watchers of the 1940s and in the minds of the men who fought under him. ●

THE MASTERS

By Furman Bisher

Excerpts reprinted from *The Masters* by Furman Bisher.
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Photos by Frank Christian

Clifford Roberts drove up to Knollwood Country Club one day in the middle of the Roaring '20s, presumably in his Pierce-Arrow or Franklin. Knollwood was located in Westchester County, where New York's wealthy went to the country for the weekend. He was a member. Bobby Jones was playing a friendly match at the club that day, and Roberts was pointedly "dropping in" to take a look at this young man of whom he had heard so much. Other details of the day grow vague, but the two were introduced and discovered they had mutual friends, among them an innkeeper named Walton Marshall, who divided his years between the Hotel Vanderbilt in New York and the Bon Air Vanderbilt in Augusta. Neither had the faintest glimmer of a notion at the time, but with this meeting the first seed of the Augusta National Golf Club was sown. . . .

Augusta National, as it turned out, was the product of impulse. Roberts knew that in the back of Jones' mind was the idea of building a golf course to his own specifications and his own taste some time, some place. As they talked of it one day, Roberts blurted out, "Why not here in Augusta?"

A beautiful blend of the minds took place on the spot. It was simply a matter next of finding the proper location, a piece of property that Jones would approve. In the fall of 1930, shortly after Jones had accomplished his Grand Slam, Roberts arrived in Atlanta with a lay of land in mind, requiring only Jones' visual approval and a plan of membership.

There is next this vision of Bob Jones walking from the doorway of the old manor house, which is block-shaped like a fortress, and standing for the first time on the grassy overlook that has since become the terrace lawn of the Augusta National Golf Club.

"The experience was unforgettable," Bob Jones wrote later. "It seemed that this land had been lying here for years just waiting for someone to lay a golf course upon it."

What they had come upon was a gentle, rolling spread of hill and valley with a spring-fed stream that only a near century of preparation could have put in such perfect condition to receive a golf course. The moment of Bob Jones' first view of it came in December, 1930. By the next spring, having heard its ultimate call, the 365 acres of land began to come alive.

While America was still a wilderness, Indians had camped upon this land, attracted by the spring that is the course's source of water, that feeds the lakes and Rae's Creek. De Soto and his marchers are said to have passed through it in their search for the Mississippi River. What the prospective founders of Augusta National Golf Club found there was a former nursery not so tenderly attended for several years. A family of Belgians had settled the property in 1857, and the nursery they created there was the first known in the South. They were of noble heritage. Baron Prosper Jules Alphonse Berckmans, motivating force behind the nursery, was a man of many splendors. Scholar, horticulturalist, landscape architect, botanist, and artist. He had arrived in this country in 1850, having taken his leave of Belgium for political and religious reasons upon which there is no elaboration. He was followed into the nursery business by his two sons, Prosper Jules Alphonse, Jr., and Louis.

The Berckmans' nursery made vast contributions to

On the first tee, 1935: (left to right) Tommy Armour, Walter Hagen, Gene Sarazen, Bobby Jones.

American horticulture, and the Augusta National Golf Club has gone to great effort to preserve and showcase that bonus that came with its purchase. For instance, all the thousands of miles of privet hedge that grow in the United States can be traced back to the mother hedge that still thrives directly back of the practice tee near where all the monstrous wagons and trailers gather in a television community each week of the Masters. The wisteria vine that seems to writhe out of the ground at the corner of the clubhouse on the terrace lawn is said to be the oldest in the country. The massive oak that stands guard like some arrogant sentry over the entire spread, from clubhouse down the gentle hill to the focal spectating point where the 2nd and 7th greens and the 3rd tee abut, is over 200 years old. Markers are found about the grounds identifying the botanical significance of all the growth of historical note—tree, shrub, and flowering plant.

Old Berckmans had remarried, and at the time of his death in 1910 he willed the property to his young widow instead of the two sons. P. J. A., Jr., and Louis soon left the area and relocated elsewhere. The young widow, having no interest in the nursery, eventually sold the property and its commercial name, "Fruitlands," and for about 15 years prior to its discovery by Clifford Roberts and friends, the acreage had suffered for lack of attention.

One of Augusta's most distinguished industrialists, Fielding Wallace, was appointed to handle the purchase for the Club and eventually became its first secretary. Also, he later became president of the U.S. Golf Association. (Around Augusta, his designation by the man on the street was unique: "The man who runs the Chinese hair factory," for his company imported the hair of Chinese women by the bales and produced mattresses and other products from it.)

As the membership was being formed, one of the first moves made by Clifford Roberts and his group was to search for and locate the two Berckmans sons and induce them to return and spend the rest of their lives on the old family place. P. J. A., Jr., became the Club's first manager. Louis, having fared more prosperously, was able to become a dues-paying member and was appointed the Club's first treasurer. In the process, they made great contributions to the horticultural rejuvenation of the grounds. And so we have a story beginning with a happy ending, and all the peripheral segments of one broad narrative coming together in the fruition of the dream of one man and the vision of another, and for a poignant side effect, the reunion of two brothers with the old soil on which they once bounded about on shoeless feet.

We take our fade-out as Bob Jones makes his solemn pronouncement as to the nature of Augusta National Golf Club and what it was all about at its origin. . . . "Our aim is to develop a golf course and a retreat of such nature, and of such excellence, that men of some means and devoted to the game of golf may find the Club worthwhile as an extra luxury where they may visit and play with kindred spirits from other parts of the nation."

It has been achieved, never veering from course.

"Unless I break down, I hope to participate every year, regardless of how I am putting or where I finish"—Bobby Jones at the first Augusta National Invitation Tournament (which would not become "Masters" officially for four more years), March, 1934. . . .

When it began, the Masters was nothing masterful at all, but a social affair that politely called itself Augusta National Invitation Tournament. The facilities of the Club were rather restricted, for it had not been constructed with the idea of entertaining the whole membership at one swoop; and so the field of players was kept small, 61 to be exact. Bobby Jones himself made up the first guest list, comprised of golfers he considered "likely to grace the tournament because of their past accomplishments in the game, their present stature, their promise, or even upon my own feeling of friendship for them."

Once was enough of this. Jones realized there was no way he could invite all the friends he chose to favor, God and everybody being aware of the origin of the guest list. This was part of the appeal, being a guest of Bobby Jones. To avoid future embarrassments and to avoid ruffling feelings, a system of qualifications was set up by 1935, to Jones' great relief, and has prevailed, with variations, ever since. Winning itself was not the lone requirement. Certain sporting qualities were also insisted upon.

Since these original requirements, qualification standards for American golfers have undergone a variety of changes, but nearly 30 years passed before the Tournament Committee felt compelled to put the red pencil to the invitation list. When the field bulged to 110 in 1962, some judicious restraints were applied. Invitations to U.S. Open, British Open, PGA championship, U.S. and British Amateur winners subsequently were limited to the winners of the past 10 years, with regret. The accumulation of past champions was assailing the fluidity of operations, cluttering up the course with creaking ancients who had no competitive chance and who had shouldered the tournament field uncomfortably close to that undesirable adjective "sprawling."

A few years later, another cutback went into effect. U.S. and British Open champions and the PGA champion were restricted to five-year invitations, U.S. and British Amateur champions to two, and thus it stands today. The only remaining lifetime invitations go to those who win the Masters. The remainder of the field is made up of the current Ryder Cup team; the Walker Cup and the World Amateur teams in alternating years; the first 24 finishers in the previous Masters; the first 16 finishers in the previous U.S. Open; the first eight finishers in the previous PGA championship; semi-finalists in the previous U.S. Amateur; and the winners of PGA tour tournaments classified as "major" for the previous 51 weeks; plus foreign players invited by rule of thumb, but always measured by their performances of the past year or the general excellence of their careers. . . .

In its first year, the Masters offered a total purse of $5,000, modest even in 1934, made up by donations of Club members. The gallery was excitingly and unexpectedly large, but Jones and Roberts operated by such

non-compromising standards, bordering on extravagance, that the tournament suffered a substantial deficit. But the Masters was launched and there would be no turning back.

The Masters to this day is the only tournament of stature that gives away pairing sheets, spectator guides, parking, checkroom service, and observation seating—that's bleachers to racetracks and baseball parks—with the price of an admission ticket. Concession prices are considerably below those of other tournaments. The Club also absorbs the 3 percent state tax, and it is not to be overlooked that profits from such an event usually are taxed to about 50 percent by the Internal Revenue Service.

Whatever it may cost, the Masters maintains the most elaborate scoring system known to golf (and it originated most of it), such as the over (in green) and under (in red) hole-by-hole scores on the big boards. Not a piece of litter is allowed to survive any sundown on the Masters' grass. It was the first to uniform its caddies. It was the first to cover its course with a security force, the Pinkerton men—a great number of whom, by the way, are successful lawyers, dentists, doctors, and businessmen who take the week away from their offices and sign on to serve as their surest way of seeing the tournament. A spectator should never be surprised to find himself being directed about in the gallery by his own medical doctor. . . .

It wasn't until 1949 that the Masters champion was included among the exclusive green jacket wearers. Lloyd Mangrum, tied with Johnny Bulla as runner-up, held it while Sam Snead slipped into the first one awarded a winner. It became a Masters tradition, and today there's hardly a tournament played in the U.S. that the champion does not walk out with a blazer of some hue. But no one can see the green jacket except at the Masters for the Masters jacket is never allowed to be worn off the premises. Members have been expelled for such violation.

Of course the Masters champion also wins a check. A player gets $1,250 just for qualifying and showing up. Old-timers who don't strike a lick get $500 for appearing. But the champion also gets a replica of the Masters Trophy to take home, a gold medal, and a silver box engraved with the signatures of all the contestants. En route to all this, it is also possible for him to win a pair of crystal goblets for eagles, a vase for a hole in one, and if you're wondering what Gene Sarazen got for his double eagle in 1935, it was a large Steuben crystal bowl, awarded retroactively in 1968. . . .

When the day is splashed with sunlight, and there is a touch of syrupy warmth in the air that plays on the horticultural outburst of Augusta National Golf Club grounds, there is no more beautiful place in American sport to be. Spring, it seems, has extracted every strain of color from the plants and shrubs and vines and trees. The green that covers its soil is so green it dazzles.

In this respect, golf has its edge over all the other games at which we spectate. Football rips its grass up in chunks. Horses run on drab, bare earth. Automobiles race on surfaces black with asphalt and stained with oil. Boats leave a wake of sludge on their waters. Baseball is played against a background of girders and concrete and an encirclement of seats for its jury. Basketball and hockey take to the grimness of warehouse life.

Golf wanders out among God's great outdoors, over hill and down into valley, through glen and glade. In no place has the natural beauty of the land been made so much a part of sport as here, where the Masters is played. There are greater golf courses. There are more spectacular golf courses. There are more excruciating tests of golf. There are other beautiful golf courses. But there is no great, spectacular, excruciating test of golf that is so beautiful as Augusta National. The key to it is that both the blossoming of spring and the arrival of the Masters coincide in all their natural and cultivated splendors.●

GOLF

A Georgia Tradition

By Susan K. Wood

In the sport of golf, Georgia had a head start. The very first golf course in America was begun at Darien in 1736 by Scottish settlers of Georgia who brought memories of Scotland's links with them to the New World. In the next century, the thirty-sixth course registered in the nation was Jekyll Island's Oceanside course, registered in 1894 when the Jekyll Club's Hundred Millionaires began retreating to their new-found resort. With four 18-hole courses, Jekyll today is still quite a popular golfing and vacation retreat, though the Hundred Millionaires have been gone for over thirty years.

Yes, Georgia has a reputation to uphold in the world of golf. For in Georgia we have the Masters, one of the world's most prestigious, most exemplary golf events. The Augusta National Golf Club, where played such notables as Dwight Eisenhower, is one-fourth of golf's Grand Slam. One of the loveliest courses anywhere, Augusta National is breathtaking even without its annual contingent of PGA players, colorful spectators and the springtime majesty that is Masters Week. Masters' badges, your ticket to this spectacle, are valuable commodities. The waiting list for tickets has been closed since 1971. But practice rounds, held the first three days of Masters Week, are open to anyone, and cameras are allowed.

However prestigious the Masters is, there are, nevertheless, two other PGA tournaments in Georgia, too, and one LPGA event, all of which host the finest golfers in the world.

The Atlanta Golf Classic, now in its eleventh year, is played annually at the rolling Atlanta Country Club on the banks of the Chattahoochee River. (In 1976, the Classic was preempted when the U.S. Open was played at the Atlanta Athletic Club, Bobby Jones' old club. It may also be pre-empted in 1981 when the PGA Championship will be played at the Athletic Club. At that point, Georgia will have played host to three of the Big Four of golf—the only exception being the British Open.)

The Atlanta Classic has become a favorite among most of the big name golfers. Nicklaus has played at Atlanta every year, although since the '79 event has been changed to the week before the U.S. Open (June 7-10), he may not play ACC this year. Most of the top money winners *do* make it a point to play in Atlanta. But the strenuous, near-mountainous course at Atlanta Country Club has in recent years kept such notables as Gene Littler and Arnold Palmer from playing. Like all golf tourneys, the Atlanta Classic is as much a social event as anything—a major part of the fun is in watching the people who come.

In the early fall, Columbus plays host to yet another PGA tour stop, the Southern Open. Sponsored jointly by the Columbus Chamber of Commerce and Southern Airlines, the event, held at the Green Island Country Club, attracts quite a few leading money winners and a fine contingent of up-and-coming players. Jerry Pate, a graduate of the University of Alabama who lived for a time in Georgia, has won the event the past two years. In recent years, the likes of Arnold Palmer and Gary Player and Ben Crenshaw have played the Southern Open—an indication of the caliber of golf you can see there. Dates for this year's Southern Open: October 11-14.

A relatively new stop on the ladies' tour has been held the last two years at the Brookfield West Golf and Country Club near Roswell in Cobb County. Formerly called the Lady Tara, the tournament, now sponsored by Anheiser-Busch, is this year called the Lady Michelob. Dates for this year May 11-13.

Last year's Lady Tara was won by Janet Coles and saw almost all the big names in women's golf: Carol Mann, Sandra Post, Jan Stephenson, Laura Baugh, Debbie Austin. Georgia's Hollis Stacy of Savannah won the Lady Tara in 1977. This tournament is a major LPGA stop and should host top women golfers again this year. As with the Atlanta Classic, the Lady Tara-Michelob's Wednesday pro-am event is usually a fun, star-studded day.

But you don't have to be a professional to enjoy a round on the golf course. There are hundreds of public and private golf courses from LaFayette to St. Marys to provide you ample opportunity. Three state parks offer golf courses, too—Victoria Bryant near Royston (9 holes), McRae's Little Ocmulgee State Park (18 holes) and Hard Labor Creek near Rutledge (18 holes)—as do the state-owned Lake Lanier Islands, Stone Mountain and Jekyll Island.●

THE EMPEROR OF GOLF

By Irwin Ross

Six years after he retired from the headlines, Bobby Jones unexpectedly appeared at St. Andrews, Scotland, the ancient shrine of golf, for a quiet morning round with friends. No public announcement had been made to the Scots that Jones had arrived. Yet he teed off before a swarming, excited mob of 5,000 spectators.

Business houses closed down. Women and children came running to join the crowd. As the now-portly ex-champion reached the third hole, virtually all of St. Andrews was on the course. In holiday spirit, more than 7,000—a greater gallery than many major championship drew—trooped after him.

Bob Jones hadn't played golf seriously for months, but for a brief time the flawless swing and the sure putting touch that no man ever equaled were his again. He dropped his final putt for a sub-par 72.

"Our Bobby is back!" cried an old Scot, tears running down his face.

At home or abroad, "Our Bobby" was box-office magic in the Golden Age of sports. He turned peaceful fan turnouts into stampeding herds, caused millions of duffers to spend huge sums trying to copy his famous stance, made public golf links a big business.

Overshadowing even such greats as Walter Hagen, Gene Sarazen, Leo Diegel and Tommy Armour, he gave golf its first universally accepted hero. When he quit in 1930 at a youthful 28, he had done more to popularize the sport in America than any man before.

During a practice round by Jones at Pebble Beach, California in 1927, three fans fell into the ocean and a dozen others were injured in the crush. When he dropped the winning putt of the 1929 National Open at Mamaroneck, New York, 15,000 trampled each other and the police to touch him. Before the 1930 National Amateur, in which Jones was shooting for the final victory of his amazing "Grand Slam," the U.S. Marines were called out to guard him.

"Will you need us if he loses?" the Marine commander asked.

"He can't lose!" cried tournament heads. "Bobby Jones is the greatest golfer in the world!"

The quiet Georgia lawyer proved it by closing out the match on the 11th green. A roar split the air—then 18,000 rioted. Scores of persons were hurled down an embankment. Only by forming a flying wedge around him did the Marines save Jones from being torn apart.

No athlete ever faced such a gnawing mental handicap as the Georgian. His unequaled record—13 major championships in 8 years—made him seem superhuman to the public. The crowds that overran the ropes to pack close around his fairway were sitting ducks for his screaming, low-hit drives. "I lived in mortal fear that I'd hit and kill somebody," Jones said.

Commercial interests naturally saw in him a bonanza matched only by Babe Ruth and Jack Dempsey. Yet he would take nothing from golf for himself, refusing more than a million dollars in all. He remained an amateur—playing for the sheer love of it—until the day he retired.

"He has more character than any champion in our history," wrote the late sports expert O. B. Keeler, Bobby's longtime Boswell. "In that is the key to his lasting appeal."

Many wealthy men sought to subsidize him, but Jones paid his own way to tournaments by hard work in courtrooms and law offices. At times he entered international events with little or no practice. He was too busy taking degrees from Harvard and Georgia Tech and studying at Emory University, before passing the Georgia bar exam.

Illustration: Jake Nunn

Mike Nunn

"First come my wife and children," he said. "Next comes my profession—the law. Finally, and never as a life in itself, comes golf."

No scandal ever touched his name. Titles and prestige meant little to him. He had no vanity. Bobby Jones was a plain, shy, modest and devoted family man.

The Scots and British idolized him for the manner in which he won the 1927 British Open. Handed the historic cup at St. Andrews, Jones replied simply:

"Nothing would make me happier than to take home your trophy. But I cannot. It was played for here 30 years before I was born. Please honor me by allowing it to be kept here at the Royal and Ancient Golf Club, where it belongs."

His dignity and common sense in a crazy age earned a vast respect. When he returned from Interlachen in Minneapolis with his third crown of 1930, some 50,000 Atlantans declared a civic holiday and marched in the streets.

Perhaps his most fitting memorial is the annual Masters Tournament at Augusta. Each year, the nation's golf aces compete over the beautiful dream course built by his admirers.

For a few postwar years, Jones played in the Masters. It was his one appearance a year and 20,000 came out to watch. His haymaker swing and hula-hip action were rusty, but he always stayed right up with the nation's top golfers.

"My golfing days are all over now," Jones said regretfully in 1951. "I just got the doctor's final report. The two operations for pressure on my spinal cord have brought little relief. Now they tell me I may never hit a golf ball again."

Among experts, there is long, futile argument over how Jones would fare against today's par-wreckers. Scores have dropped, but so have courses been softened and equipment improved. Let it go that the Jones record is unique.

At nine, he was playing against grown men in tournaments. At 14, he was in big-time competition and winning. At 21, he was National Open champion. After that, he accounted for 13 of the world's top titles: 4 U. S. Opens, 5 National Amateurs, one British Amateur, and 3 British Opens.

Finally, there is the Grand Slam, perhaps the most notable sports achievement of all time. In 1930, Jones took on such tremendous low-scorers as Mac and Horton Smith, Bobby Cruickshank, Harry Cooper, Sarazen, Francis Ouimet, Diegel, Johnny Farrell, MacDonald Smith, Whiffy Cox, Armour and Hagen, and beat them all. He won in one year all four of the big championships: the U.S. Open and Amateur, the British Amateur and Open.

(Today the "Big Four" tournaments are the U.S. Open, the British Open, the P.G.A. Championship and the Masters. No player has yet to record a modern Grand Slam—all four in one year.)

The Jones story begins with a fight for life. Born on St. Patrick's Day in 1902, in Atlanta, he was a scrawny specimen whom seven doctors despaired of saving. Until he was five, Bobby could eat little because of a serious digestive ailment. Other kids scampered in West Peachtree Street; the Jones boy with the thin legs and big head sat on the porch and watched.

Around 1908, when he was 6, the Jones family moved to an Atlanta suburb which was near a golf course. The senior Jones, a lawyer, took up the game with enthusiasm. Bobby tagged along, first to watch, then with a set of cut-down clubs.

In time, the long walks strengthened his legs. Six years later club members were startled by a note on the bulletin board:

"Bob Jones, Jr., age 12, today shot a 70, tying the course record."

Older Atlantans who knew him well said that the change in his appearance the next few years was incredible. At 15, his once-frail frame had taken on a solid 165 pounds.

There was never such a golf prodigy as the reborn Bobby. He was Georgia state champion at 14 and went to the third round of the National Amateur, defeating an ex-titleholder, Eben Byers, along the way. At 15, he was Southern champion; at 17, runner-up in the Canadian Open and National Amateur. Such success, he admitted, made him cocky and hot-tempered. When he missed a shot, he threw his club at the nearest

tree—and press reports began to grow uncomplimentary.

"Golf to me then was just a game at which to beat someone," he said. "And of course, I didn't know that the someone was myself. Harry Vardon, the great English star, helped me see the light."

Playing the crusty Vardon at Toledo in 1920, Bobby was his usual brash self. The two were about even when the youngster hit a miserable dribbler into a bunker. Thinking to ease his embarrassment, he called, "Did you ever see a worse shot?"

"No," Vardon replied coldly. It was the only word he spoke to Jones during the match.

Bobby learned the cruel facts of tournament golf too early. Because he was a boy wonder, sports writers drummed at the fact that he just missed winning in the big events. At 18, he was second in the Western Amateur and lost in the National Amateur semifinals. Word went around that the Jones boy lacked fortitude in the clinch.

The climax came in the 1921 U.S. Amateur at St. Louis, when Bobby bowed before Willie Hunter, never his equal, in the third round. As he bitterly walked away, Jones heard a golf writer remark: "Sure—he's the greatest shotmaker we have. But he hasn't the guts to win!"

He was 21 when he went to the U.S. Open at Inwood, Long Island, in 1923. In seven years, Jones had played in 11 national championships without a victory. Golf, which had given him health, had become a plaguing, nerve-twisting thing.

"I was sick of the pressure, of the self-doubt," he stated. "If the lane hadn't turned at Inwood, I think it would have gone straight on to end in the shadows."

The shot with which he saved himself as a golfer came on the 18th hole of his title play-off at Inwood with the crafty Cruickshank. The crowd groaned when Jones' drive was sliced into the rough. It was a question of making a safe recovery to the fairway or risking everything on a 200-yard iron shot out of the brush to the green.

Jones didn't hesitate. He walked to his ball, swung with all his power. It soared over the underbrush, flashed past the startled crowd, and fell almost dead to the pin. The long struggle was over—he had his first major championship.

From 1923 on, Jones won a title a year, often two. Finally, he won all four. But the "Jones special" came in the 1930 U.S. Open at Interlachen. Lloyds of London was willing to wager 50-1 against his winning all four of the important titles of the year. Excitement was electric as he faced the final putt on the 18th green —the putt he needed to beat MacDonald Smith.

"The ball was 40 feet from the cup, a terrible distance under such conditions, and between the two was an undulation green," an eyewitness described the dramatic moment. "Out came 'Calamity Jane,' his fabled putter. For just seconds he eyed the hole. Then, with utter coolness, he hit the ball—hard. Up the slope it climbed, out into the sunlight it sped and, curving with the grain of the green, scurried into the cup for a birdie three! The gallery was in a frenzy. Bobby narrowly escaped with his clothes on."

On November 17 that same year, the sports world was stunned when he announced that he was through. Thousands wired and wrote him to reconsider. Yet, once again, this was the sound logic of Jones exerting itself. At best there could be nothing but anticlimax left. What sadder sight than a great champion who lingers too long? Wisely, Bobby Jones retired at his peak and went home to pick up his career in law.

* * * *

The Atlanta Journal Saturday, December 18, 1971

ATLANTA — Bobby Jones, the golfing great who overcame a sickly physique in his youth to win 13 major golf championships and the game's only Grand Slam, died today at the age of 69.

Cause of death was bleeding and heart failure brought on by the rupture last week of an aneurism Jones had suffered for some time. A crippling spinal injury Jones endured more than 22 years had contributed to a weakened condition that had prevented surgery to correct the aneurism, his doctor said. ●

Irwin Ross is a psychologist and golf enthusiast from Chicago, Illinois.

preserving an island:

Ossabaw

by Lucy Justus

Jim Couch

Ossabaw Island is 25,000 acres of high ground, marshes, beaches, dunes, streams, wildlife and history.

The island was owned by one family from 1924 until 1978 when it was acquired by the state and dedicated as a Heritage Preserve. Since then the Georgia Department of Natural Resources has been learning about Ossabaw. Wisely managing an island abounding in both ancient and natural history requires immensely detailed study and considerable depth of understanding.

Among Georgia's coastal islands, Ossabaw is something special. It is an excellent example not of the type of preservation which allows nothing to be touched, but of conservation: use with great respect for the land, its role in nature's plans, and its heritage value in the years to come.

Ossabaw, inhabited for at least 4,000 years, was first used by prehistoric Indians. In the heyday of the Spanish main, it was a haven for pirates.

In September 1597, Ossabaw, like several other islands, was the scene of a massacre. Rebelling against the restraints of the Catholic Church, a young brave from Guale (now Amelia Island) set out to silence a Spanish priest who had reproved him. His anger then flared into a determination to kill all the priests he could find. On Ossabaw, Father Michael Aunon, hearing of the approaching marauders, said Mass and gave Communion to his companion, Brother Anthony Badajoz. The two were clubbed to death as they knelt in prayer.

The island remained in Indian hands until May 17, 1760 when it was sold to settle claims by Mary Musgrove Bosomworth against the British Crown and James Edward Oglethorpe. Grey Elliott bought the island at public auction for 1,325 pounds, and it has had remarkably few owners since.

By the antebellum era, it had been divided into four cotton plantations, worked by more than 1,000 slaves. Emancipation ended the plantation age on Ossabaw as elsewhere. Early in the twentieth century, Ossabaw came into the hands of a wealthy and foresighted doctor who maintained it as a family retreat.

That physician, Dr. Henry Norton Torrey, from Detroit, bought the island in 1924. Dr. and Mrs. Torrey's guest book begins in 1926 with the signature of Henry Ford, the first of hundreds of Torrey family guests from the United States and foreign countries to be captivated by the Ossabaw mystique.

While the owners of some islands subdivided their property for development, Dr. Torrey and his family worked to enhance and protect Ossabaw.

When Dr. Torrey died, he left the island in undivided shares to his heirs. His daughter Eleanor Torrey West, at the death of her mother, became the principal owner of Ossabaw with title to the family home and half the island.

"When my mother died and left me an undivided half-interest and my brother's children (three nephews and one niece) the other undivided half-interest, I wanted to let just everybody come because I felt socially guilty to have this huge beach and everything all to myself," Mrs. West recalled. "My husband said, 'This is a great responsibility. You simply cannot ruin it by your feeling of guilt. Let's sit down and figure out a way we can share it that will not destroy it.' Of course, I immediately saw that, and it was exactly what I wanted."

Sharing her island became a full-time career for Mrs. West and she devoted herself tirelessly to it. She and her husband, Clifford, established the Ossabaw Island Project Foundation, funded almost entirely by their donations. Through the foundation, Mrs. West opened her home and her island to scientists, teachers, artists, writers, theologians, photographers and craftsmen as a place to work, rest or seek inspiration.

"I think this is the only place that is interdisciplinary and has no age limit," Mrs. West said. "People have the leisure to work and they are never tortured by any scheduling. It is not a think tank. They do their own work but they can communicate with others when they want."

For a very nominal fee, such people can come to Ossabaw for varying periods of time. For those with worthwhile projects but little money, scholarships are available. Except for a brief space during the summer, which Mrs. West reserves for rest, she frequently has as many as 20 guests, and, although she has never advertised, she has more applications than she can accept. Her waiting list runs about two years in advance.

Mrs. West also invited the very young—school groups accompanied by their teachers—to observe nature and revel in its beauty during brief excursions to the island. Some of the kids who come have never climbed a tree or seen a wild animal outside a zoo.

Other things evolved from that beginning. The Genesis Project, started in 1970, brings students to the island to pursue individual studies. While working on their projects, they live in wooden shacks, tree houses and other shelters, grow their own vegetables, cook their own food and drink milk from the island cows. Schools which have been represented in the Genesis Project include Bryn Mawr, Georgia Tech, Princeton, Shorter, Emory, Furman, California State and the Universities of Georgia, Massachusetts, Oregon and Rhode Island. Ossabaw has also been used for scientific research by Pennsylvania State University, the University of Wisconsin, Shorter College, Emory University and the University of Georgia.

Like her parents, Mrs. West was devoted to Ossabaw, but the problems of owning an island or other large tract of land are enormous. Such things as natural and heritage values of the land, for instance, are not considered when taxes are levied. Although Mrs. West could afford to maintain the island as private property, she felt sure her children in later years could not. Ten or more years ago, she began looking for someone to whom she could entrust the island—a "landlord" who would protect it from the type of use she considered unacceptable.

"I had three priorities," she said. "The first was the preservation of the land. I think the land is more important than any of us. The second was the people who live here. One of them has been on the island since the family came in 1924, and almost everybody else has been here for 25 or 30 years. I simply could not face their having to leave. The third priority was my work. And, behind everything, of course, was this idea of mine that you can preserve a piece of land and still use it."

Mrs. West's search for a suitable steward was often frustrating and discouraging. Many seemingly promising avenues, both governmental and private, turned out to be dead ends. And some people who wanted to buy the island did not want it for things Mrs. West approved. "We were offered a lot of money for Ossabaw," she said. "Somebody asked me how much and I didn't know because we never followed through on any of it. As soon as we found out that it was for development, or that it wasn't a safe thing, we never went any farther with it. I didn't even find out the names of the people."

Finally, through a $4 million gift to the state by Atlanta philanthropist Robert W. Woodruff and a donation by Mrs. West and the Torrey family, amounting to about $7 million, Georgia was able to buy Ossabaw. Mrs. West retained a life-interest in the main house. She and the seven island families will remain on Ossabaw, and her work will continue as before. The Ossabaw Island Project Foundation has been granted a Use Agreement for the non-exclusive use of certain areas of the marsh, marsh hammocks, islands and uplands on the northern portion of Ossabaw, permitting the foundation to continue its scientific, educational and cultural program, related research and other activities. The agreement is for five years with the option to renew for an additional three years.

"I am absolutely thrilled that Ossabaw has been saved," she said.

Three members of the Department of Natural Resources and their families will live on Ossabaw: a wildlife biologist, a wildlife technician and a mechanic. Biologist Jerry McCollum moved to Ossabaw in January 1978, five months before Ossabaw officially became state property, to begin the department's work. Much of his time during those first months was spent getting to know the island and its people.

"I didn't do any talking," Jerry said. "I listened. I worked hard at learning about the people and what they did both for a living and for fun. As we become established, we will try as much as we can to work the

Bill Bryant

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way we have always worked and to make changes slowly."

While he listened during those early months, Jerry also worked on preliminary plans to be put into effect when ownership was officially transferred. Since the existing buildings and maintenance facilities on the island were leased back to the Ossabaw Foundation, housing for the DNR staff was one of the first needs that had to be met. The staff also needed a shop for maintaining vehicles.

The shop is now complete and the houses are nearing completion. The homes, designed to blend as much as possible with the landscape, will be heated and cooled mainly by passive solar energy. A sun room on the south side will warm each house in winter by the same "greenhouse effect" which heated homes in ancient Greece. The only supplemental heat will be wood-burning heaters. During the summer, an intricate ventilation system will cool the houses by island breezes.

"In some ways we are stepping back a decade or two to the time when people had to get up and think about whether the sun was going to shine, whether they ought to build a fire or if it was getting cold and they needed to chop some wood," Jerry McCollum said. "If you live in town, you don't have to think about those things."

Life on an island is different in many ways from life on the mainland. But in the opinion of Ossabaw's residents, including the DNR staff, any inconvenience is more than compensated for by the beauty and fascination of the island itself. It would take an exceptional person to dislike or be bored by Ossabaw. There are 11 miles of white sand beach where sea turtles come on summer nights to lay their eggs. And points where one can look across the shorelines of ancient oceans. There is an avenue of palms and one of live oaks, some of which are hundreds of years old. And several of the tabby slave cabins still stand.

Fish, shrimp and crabs are available for the catching and not many minutes of a walk or drive around Ossabaw pass without sight of some form of wildlife.

When Dr. Torrey bought the island in 1924, he estimated that wild cattle numbered 2,000 and hogs 10,000 and observed that both were descendants of domestic stock which had been wild for generations. Because of a tick problem with the cattle, Dr. Torrey brought Texas cowboys to the island to remove the herd. However, cattle were later restocked on the island. Ossabaw also has about 30 horses and 90 donkeys which range the island.

The most immediate drastic change on the island will be the fencing or removal of feral cattle.

"The relationship of recovery of vegetation to the reduction of feral stock is something we are interested in seeing," Jerry McCollum said. "I think there are some fairly good plant lists for what vegetation has been here in the past and it will be interesting to see what happens in the next 25 or 30 years. You would expect most of the naturally occurring island plants and coastal plain vegetation to be here, but they aren't now. A lot of them are missing. There are almost no spring wildflowers and relatively few during the summer as compared to those on the mainland.

"I think many plants which have succumbed to grazing pressure will probably come back. It is difficult, but not impossible, for a feral population to destroy a particular species. It can be done but my guess is that there are still a few around and they will come back."

DNR will be busy for some time to come conducting studies which will provide much more information about Ossabaw than is now available. In these studies, the department will benefit from the professional research program of the Ossabaw Foundation, with the two coordinating their activities in order to assure the maximum benefit from any particular research project.

"Ossabaw is unique in many ways and it may be the finest effort ever made in Georgia to preserve a very unusual place," Jerry McCollum said. "This island deserves the very best work, whether it is research or management, that we can give it.

"It is different from other islands although they have generally the same vegetation. There are differences because of the culture of the island, the history of the island, the way it was used, who was doing the using, what has happened recently and what has happened over the long term.

"The most significant differences, I think, may be the historical patterns that either divided or held together the islands and the kind of uses they have had over the years. It is going to be a long time before we know what the nature of the ecosystem is here at Ossabaw and before we can compare it to anything else.

"Ossabaw is the way it is as much because of the use it has had as because of natural forces. I think people need to understand that. Ossabaw is an extremely special place and deserves special attention."

Of the seven families who have lived on the island for years, most of them are delighted to see the state assume ownership because it represents the end of Mrs. West's long struggle to find an owner who would protect Ossabaw.

"That attitude has made my job awfully easy in some ways," Jerry McCollum said. "It has been a hectic and time-consuming job with 16-hour days as a rule and 20-hour days sometimes. But without the cooperation of the people living here, I wouldn't have half the things completed that are completed."

For many years, Mrs. West's dream, her goal for Ossabaw, has been to share the island in a useful, non-destructive way. That is also the goal of Natural Resources Commissioner Joe Tanner. Commissioner Tanner believes the real significance of Ossabaw will be in the future. "If you look down the road 50 or 100 years, or even less, when other states have destroyed their coastal areas with unwise development or overdevelopment, Georgia will have one of the unique places in the world," he said.

"Free enterprise—business and industries—make long-term investments fully realizing it will be a long time before they reap the kind of benefits they might expect from that investment. I don't think government ought to be any different. We ought to make long-term investments too and that is what we have been fortunate enough to do at Ossabaw. I think just the natural ecosystems of the area are well worth more than the state put into the island.

"The ecosystems of Ossabaw are very important to the state. If we never did anything with the island except let the natural processes work, it would be a good investment. The beaches, dunes and marshes are important in protecting the mainland. There are some 15,000 acres of saltwater marshes around this island, in addition to the fresh water marshes. This estaurine area is exceedingly important to our commercial fishing program on the Georgia coast.

"Anything we do with Ossabaw needs to be done with the sensitivity of recognizing how fragile it is, how ever-changing it is, how the beaches build up, how they erode away, and that any public use made, whether it is educational, scientific, or whatever, has to be made within the constraints of the island itself." ●

focus:

Georgia's Protected Species

America's Eastern Bluebird

By Rosalind Platt

"The bluebird carries the sky on his back," wrote Henry David Thoreau. From the rural habitats of open woods, clearings, roadsides and orchards, to suburban gardens and city parts, it was once common to see a small, bright blue songbird foraging for insects or singing his melodious courtship song. Friend to the farmer and a welcome sight to weary winter eyes, this gentle harbinger of spring ranged from the Atlantic to the Rockies. That was fifty years ago. Today, the eastern bluebird (*Sialia sialis*) is struggling for survival.

Found exclusively in North America, the eastern bluebird is one of three closely related bluebird species and, like the robin, is a member of the thrush family. The male bluebird sports a bright blue back and tail, rufous throat and breast, and white underparts. The female of the species resembles the male but is much duller in color, appearing brownish blue on the head, nape and back. A mature bluebird is 6½ to 7½ inches long, from the beak to the tip of the tail.

Bluebird populations have been drastically reduced within the past 25 or 30 years by as much as 90 percent. Severe winter weather in the South can be cited as one factor in the bluebird's decline, although, historically, the populations overcame winter losses within three or four years. The bluebird's failure to recover from an unusually harsh 1958 winter points to other reasons for its precarious position.

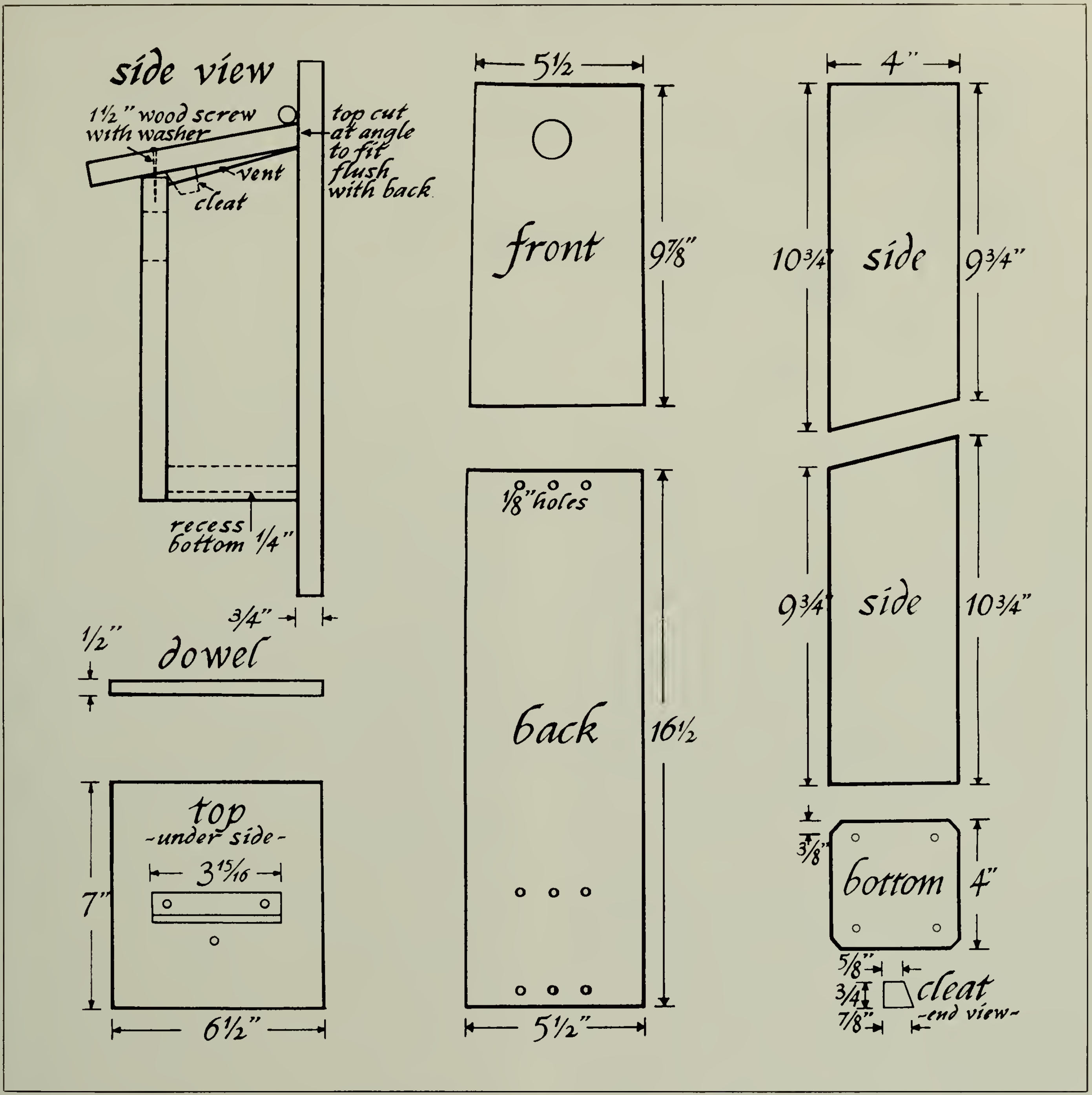
Increased application and potency of pesticides, especially the persistent chlorinated hydrocarbons, are believed to have severely restricted the bluebird's use of favored habitats such as orchards and gardens. Hard pesticides are gradually being phased out by less harmful chemicals, and, hopefully, biological controls will eventually supplant their use altogether. Again, other factors must be involved in the bluebird's sharp decline.

Two major reasons are seen as responsible for the plight of the eastern bluebird: a serious shortage of suitable nesting sites and severe competition from other bird species for nest sites which are available.

When nesting begins in the early spring, bluebirds, which are strictly cavity nesters, seek out an existing

BUILDING A BLUEBIRD HOUSE

Bluebird nesting boxes are simple to construct, using these plans. Use boards 3/4" thick. A hinge may be used on top instead of the dowel, with the top held down by a hook and eye on each side of the box.



cavity in which to start nest construction. Usually at a height of five to 20 feet above ground, cavities in rotting trees, branches or stumps, wooden posts or constructed birdhouses are utilized as nest sites. The female lays a clutch of from three to six pale blue or white eggs in a nest neatly constructed of dry grass or other plant material. Incubation, performed almost exclusively by the female, usually takes 13 or 14 days. Hatchlings remain in the nest from 15 to 20 days and are fed by both parents every few minutes during daylight hours. Once they have fledged, the young birds are cared for by the male parent, while the female builds a new nest and lays a second clutch. As many as three broods may be raised within a season in Georgia and other states in the southern part of the bluebird's range.

The bluebird is primarily an insectivore, and its diet consists chiefly of grasshoppers, beetles and other insects, many of which are injurious to crops and gardens. Berries and other occasional fruits may be eaten during June and July.

Available bluebird nesting sites have been sharply reduced through removal of dead trees in timber management and through the modern practice of replacing wooden posts with metal ones. However, the real doomsday for the bluebird came, unwittingly, in the 1850s with the introduction of the house sparrow into the United States and, more seriously, in 1890 when a small group of bird lovers calling themselves the Acclimatization Society released in New York's Central Park 80 starlings imported from England. Their goal was to establish in America all of the bird species mentioned in Shakespeare's plays. The house sparrows and especially the larger, belligerent starlings proved to be highly adaptable and aggressive birds which quickly usurped the nesting cavities used by the bluebirds. While starlings and sparrows can nest in locations other than cavities, the bluebirds are left with no alternative, and, hence, the bluebird population has dwindled to its present low ebb.

How You Can Help

Seldom can individual effort alone be significantly effective in recovering the population of a rare wildlife species. Yet, in the case of the eastern bluebird, simple construction of starling-proof bluebird houses can save this songbird from being eliminated altogether. It has been clearly demonstrated that these efforts can help bluebird populations recover locally within a few years. Conservationists are calling for a nationwide commitment to construct bluebird houses and "bluebird trails." The trail consists of a series of nesting boxes spaced approximately 100 yards or more apart, in suitable locations, in such a way that they can be monitored weekly by foot or car to remove sparrow nests and old bluebird nests.

While bluebirds will nest in almost any kind of box which will accommodate them, a few simple requirements must be met to insure that the nesting box will not be disturbed by competitors. The key to construction is the size of the entrance hole: it must be large enough to allow the bluebirds to enter and small enough to prohibit starlings. The entrance hole of the box should be exactly 1½ inches in diameter and should be not less than six inches above the floor. If the box is any shallower, starlings can reach through the hole with their heads and destroy eggs or young birds.

Dimensions of the inside floor may be from 4x4 to 5x5 inches; the smaller dimensions tend to discourage house sparrows which build a bulky nest. Drainage holes should be located near the floor corners. Design the top of the box so that it opens easily for observation, cleaning and removal of possible sparrow nests. If the box is to be painted, which is not necessary but will prolong the life of the box, several points should be adhered to: 1) use a light color to avoid heat absorption; 2) exterior-type latex paints are best—do not use lead-based paints or chemical wood preservatives; and 3) do not paint the inside of the box or the inside rim of the entrance hole. The construction plans shown here for a simple nesting box have been developed and well-tested, and their wide use has proved them highly successful.

An extremely important factor in the success of bluebird nesting boxes is suitable location. Today, bluebirds nest primarily in areas outside of cities and large towns. Thus, outlying suburbs, small towns and rural areas are likely to find more potential nesters. Box location should be in an open area (bluebirds seldom nest in deep shade), preferably with scattered trees and at a considerable distance from buildings, and in an area free from heavy pesticide or herbicide use.

A bluebird nesting pair will tenaciously defend its territory against all other bluebirds (although not against other bird species), and therefore, nest boxes should be spaced about 100 yards apart. Ideally, the box should face an open area with a tree or fence 25 to 100 feet in front of it, to offer the young birds a close, protected resting place on their first flight.

To avoid predation by snakes, raccoons, skunks and cats, it is best to mount the nest boxes on posts rather than trees. Metal posts are good deterrents, especially when coated with soft automobile grease or equipped with protective sheet metal collars or conical guards at least 18 inches wide attached just below the boxes. Height of the box should be from three to five feet above ground. Since bluebirds select their nest site very early in the season, boxes should be mounted by February 15, though boxes set out any time before the first of August may be utilized by late nesters. In order for a nest box to accommodate the two or three broods which may be raised by bluebirds each season, the bluebird nest should be removed as soon as the young birds leave. Each February the boxes should receive a thorough cleaning and any needed repairs, with care taken to keep the drainage holes open.

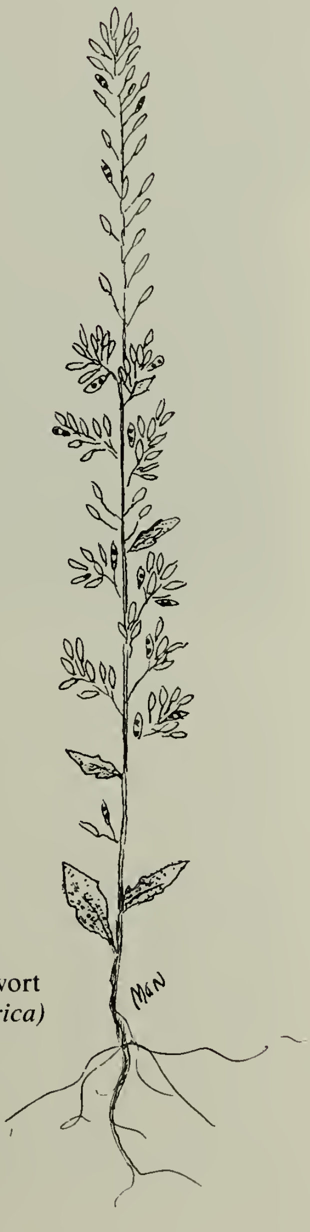
Dramatically, the bluebird's destiny rests, not in legislation or in conference room discussions, but rather in the hands of individuals who are motivated to help preserve America's wildlife heritage. Active participation in the effort to house the bluebird can be fun, and, if large numbers of people become involved, can reverse the population trend of this charming and valuable songbird who "carries the sky on his back." ●

focus:

Georgia's Protected Species

Granite Outcrop Plants

By Steve Bowling
Botanist, Game and Fish Division



Whitlow-wort
(Draba aprica)

The granite outcrops are among the most unique and beautiful plant habitats to be found in Georgia. Their rock garden-like display of flowers in the early spring is different from that of any other plant community and can be breathtaking in its beauty. Four of Georgia's protected plants grow almost exclusively in this habitat.

Granite outcrops occur in Alabama and North and South Carolina, but they are particularly abundant in the Piedmont of Georgia. Though they can be seen throughout the central portion of Georgia, most granite outcrops occur to the east of Atlanta. Stone Mountain is probably the best known of all of them.

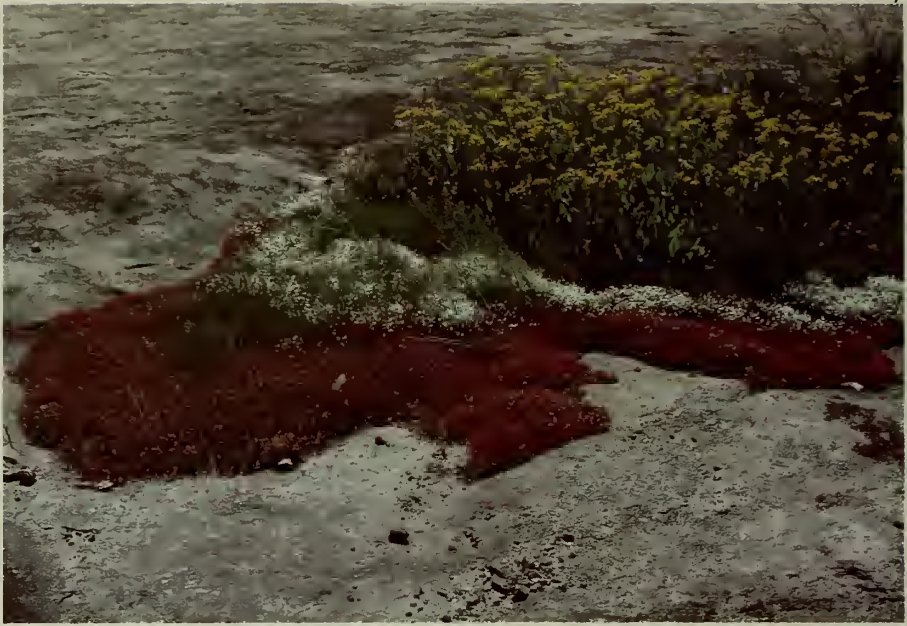
Stone Mountain began its formation over 300 million years ago. While Georgia's other granite outcrops vary in age, most were formed in a similar fashion. Molten rock pushed its way into the rock above and gradually cooled. Then the surrounding rock very slowly eroded away to leave the exposed granite. Once exposed, the granite itself began eroding even more slowly. Some outcrops wore down to produce "flat rocks" while others, like Stone Mountain, retained a dome shape.

Through the millions of years since these outcrops were first exposed, several plants have evolved that are uniquely adapted to this harsh environment of thin soil, full sun and seasonal heat and drought. Some of these grow nowhere else in the world, and all of them illustrate how plants constantly seek to colonize bare rock and soil.

The first to cling to the rock are the lichens and mosses. They exude a weak acid that together with rainwater, which is also slightly acid, slowly dissolves the rock. Small, shallow depressions begin to form and fill with grit, some acidic humus and rainwater. This hastens the dissolving, and slowly the depressions grow deeper.

When between one-half and three inches of grit has collected, the first seed-bearing plant, diamorpha, invades the depressions. Diamorpha *(Sedum smallii)* is a strikingly attractive plant no more than two or three inches tall, with red leaves, and tiny (one-fourth inch) pinkish-white flowers. It is known as a winter annual, because the plant grows through the winter and in the spring blooms, sets seed and dies. The seeds lie dormant through the heat

Franklin McCamey



Granite outcrop depression in spring bloom. Red: Diamorpha (in ½-3 inches of soil). White: Sandwort (in 3-6 inches of soil). Yellow: Wooly Ragwort (in 6-15 inches of soil).

Below, Dwarf stonecrop (Sedum pusillum)

and drought of the summer to sprout only with the return of rain and cool weather in the fall.

When a depression grows deep enough to have between three and six inches of soil, large, branching lichens and the sandwort (*Arenaria uniflora*) appear. Sandwort is another low winter annual with half-inch white flowers that bloom along with those of the diamorpha.

When the soil reaches a depth of six to 15 inches, the large, shag-rug-like haircap moss (*Polytrichum commune)* and perennials such as wooly ragwort *(Senecio tomentosus)* and sunnybells *(Schoenolirion croceum)* appear. Wooly ragwort is about a foot high with gray-felty leaves and, in spring, a cluster of yellow daisy-like flowers. The sunnybells flower at the same time with spikes of small, orange-yellow, star-shaped blooms.

If a depression gets deep enough to have more than 15 inches of soil, it may support a shrub or small tree such as loblolly pine (*Pinus taeda*), red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*) or serviceberry (*Amelanchier arborea*). However, in drought years these often die.

Because even the deeper depressions grow gradually shallower toward their edges, the first three groups of plants mentioned above may occur in colorful concentric rings or half-rings around the deeper portion. This gives a bull's-eye or off-center bull's-eye appearance.

The granite outcrops are most attractive in the early spring when all of the species mentioned above are blooming, creating a "dish garden" effect in the rock depressions. The hot, dry summer months produce no spectacular floral displays; however, there are a few species that thrive and bloom even then. Among these are fameflower (*Talinum teretifolium*) with its small magenta flowers and Curtiss' milkwort (*Polygala curtissii*) with heads of small pink and yellow flowers. In the fall there is the spectacular display of the Confederate daisy (*Viguiera porteri*) with its bright yellow flowers filling all but the shallowest depressions.

DNR Photo

Four of Georgia's protected plants occur on the granite outcrops. These are quillwort, amphianthus, whitlowwort and dwarf stonecrop.

Quillwort (*Isoetes melanospora*) is an inconspicuous plant that resembles a short (two inch) tuft of grass. It grows submerged in water on the bottom of a relatively uncommon type of rock depression which has a shallow (one-half to three inches deep) layer of soil in the bottom but a high enough rim to hold water during the wetter times of the year. When the pool goes dry, the quillwort goes dormant until the rains come again. The quillwort grows only on granite outcrops in the Piedmont of Georgia. It is listed as threatened by the state of Georgia and is being studied for possible endangered or threatened status under federal law.

Amphianthus (*Amphianthus pusillus*) is another inconspicuous plant that grows in the same water-filled depressions as the quillwort. It is unusual because it has leaves and flowers that float on the surface of the water and others that form a tiny rosette under the water. The

Leonard E. Foote

September display of Confederate daisy (Viguiera porteri).

small (one-eighth inch) white flowers above the water open for pollination while those below the water remain closed and pollinate themselves. Amphianthus is a winter annual that blooms, sets seed and dies in the spring before the pool of water disappears for the summer. When late fall rains come, the seeds sprout, and it begins its life cycle again. It grows only on the Piedmont granite outcrops of Georgia and one place in Alabama and another in South Carolina. Amphianthus is listed as endangered by the state of Georgia and has been proposed for endangered status under federal law.

Whitlow-wort (*Draba aprica*) is another small (one-foot or less), easily missed plant that has a wand of small (one-fourth inch), white, four-petalled flowers. It grows in the shallow soil on and around the edge of granite outcrops. Being a winter annual, it blooms in the spring, sets seed and dies before the summer. Whitlow-wort is found in the Piedmont of Georgia and South Carolina and also in Arkansas and Missouri. It also is listed as endangered by the state of Georgia and has been proposed for endangered status under federal law.

Dwarf stonecrop (*Sedum pusillum*) closely resembles the related diamorpha, but its leaves are blue-green instead of red and are longer and more cylindrical instead of short and rounded. Though it does not make the display that the red diamorpha does, it is an attractive plant sometimes making low (two inch), loose patches. It is another winter annual, the small (one-fourth inch), four-petalled white flowers appearing in the spring. Dwarf stonecrop usually grows under or near cedar trees in the shallow soil on and around the edge of granite outcrops, in the Piedmont of Georgia, North Carolina and South Carolina. Apparently the red cedar extracts calcium from the granite and concentrates it in its leaves. The humus formed by the leaves it sheds provides necessary calcium for the dwarf stonecrop. Because it is dependent on this unusual relationship, dwarf stonecrop is threatened by the cutting of red cedar on the outcrops for picnic fires. It is listed as threatened by the state of Georgia and is being studied for possible endangered or threatened status under federal law.

There are several reasons why quillwort, amphianthus, whitlow-wort and dwarf stonecrop are considered endangered or threatened. To begin with, these species are naturally rare due to their restricted habitat and limited range. Those activities of man that adversely affect them merely make them rarer. The plants themselves are designed to grow under harsh conditions and appear to be able to withstand a surprising amount of abuse. However, they cannot survive the change or destruction of their habitat. Some of the things that adversely affect them and other outcrop plants are quarrying, trash dumping and littering, picnic fires and being run over by recreation vehicles or trampled by too many feet. Not realizing that the plants will not survive away from the granite outcrops, some people collect them for dish gardens, terrariums and rock gardens.

The granite outcrops are beautiful and fascinating places to visit and may be enjoyed without harming them provided the visitor is careful to avoid the activities just mentioned. The best time of the year to see a granite outcrop is from the last week in March through the first two weeks in April. Another good time is mid-September when the Confederate daisy is in bloom. Stone Mountain Memorial Park and Panola Mountain State Park, both near Atlanta, are excellent places to see granite outcrops. ●

Big Fish Contest 1978

By Aaron Pass

It was either a poor fishing season or nobody wanted to invest in the postage necessary to enter the *Outdoors in Georgia* Big Fish Contest. We received the lowest number of entries in years. Probably most of you are like me, you kept intending to get around to it and never did. There's a frozen brown trout in my freezer that I've been going to send to a taxidermist for almost a year.

The low level of participation will certainly not dim the happiness of the winners, however. They will get their names on the annual revolving trophies for black and white bass. The white bass winner will receive merchandise prizes from Pflueger which will be presented at the annual meeting of the Georgia Wildlife Federation which cosponsors the contest.

This year's winner of the black bass award will be the youngest ever to have his name chiseled onto the black bass trophy. Ten-year-old Link Henderson of Griffin reeled in a 10 lb. 2-1/3 oz. largemouth out of Harrell's Lake to claim the prize.

The old white bass pro, Mike Gozdick, is getting the family name on the Pflueger trophy one more time (this makes the fourth time). He caught a 3 lb. 2½ oz. out of Lake Lanier. We're thinking about using ditto marks from now on.

A 2 lb. 10 oz. redear sunfish (shellcracker) caught by McAdoo Shepherd of Warner Robins took the largest bream this year.

This year we've decided to add a new dimension. Over the years we've had a number of entries from folks who have caught unusual fish. Some of the species are very rare and others are seldom fished for, consequently they are not included on our contest list. Still these are valid, verified state records and although they are not eligible for prizes, we feel that they do deserve recognition.

In 1972, Elden Mercer of Fargo caught a 1 lb. 3½ oz. redfin pickerel in Cypress Creek. His "unofficial" state record stood until 1977 when Tillman Booth of Millwood caught a 1 lb. 8 oz. redfin out of Surveyor's Creek in Clinch County. His is the current record.

The redfin pickerel *(Esox americus americus)* is found almost statewide but is most abundant in the blackwater creeks and swamps of South Georgia. It is an aggressive little fish related to the chain pickerel *(Esox niger)*—also known as the jackfish; however, its small size makes it less important as a sport fish than its larger relative.

Bass anglers take note, we have another state record on another black bass species. This one is called the Suwannee Bass *(Micropterus notius)* and it is indigenous to the Suwannee and Ochlocknee river systems in Georgia and Florida. It seems to prefer cool, clean spring-fed waters and limestone and other rocky shoal areas. It is regularly taken by fishermen, particularly in the Santa Fe River in Florida. The state record specimen was taken by Tommy Lee Cooper of Cairo on the Ochlocknee River in 1974. It weighed 3 lbs. and is the largest recorded in Georgia.

Another nice catch on a normally obscure fish was James Andrews' 5 lb. 8 oz. brown bullhead taken from the O. F. Veal pond near Sandersville in 1976. The brown bullhead (also called a "speckled cat") is a common pond and reservoir resident. Andrews' catch was a real whopper, since brown bullheads in the 2-3 lb. range are usually considered big.

Probably the top glamour trophy of the past season was caught by T. G. Dunn of Clarkesville. Dunn was fishing in Tallulah Lake last summer when he hooked up with a real fish. After the struggle he had a 13 lb. 8 oz., 39 inch long northern pike *(Esox lucius)*.

The pike is a close relative of the common chain pickerel or jackfish but is a northern species and not native to Georgia. This fish's presence here was explained by Russ England, fisheries biologist for DNR. It seems that from 1973-77 both northern pike and pike x pickerel hybrids were introduced into several north Georgia lakes. The purpose of the experiment was to find a shallow water predator to utilize high bream and yellow perch concentrations and to provide anglers with a high quality sportfish. T. G. Dunn, who now holds the state record for northern, will probably agree with the latter objective.

Another northern fish which occasionally shows up in Georgia creels is the sauger *(Stizostedion canadense)*, a member of the walleye-yellow perch family. Sauger are native to the North and Midwest but were stocked in Georgia in the late sixties. Randall Kerlin caught a 3 lb. 1 oz. sauger in Clark Hill last March which gave him a state record.

The reports of these unusual fish are valued since they add to the department's knowledge of what is being caught where. Although the new state record holders for redfin pickerel, Suwannee bass, brown bullhead, northern pike and sauger won't get a rod and reel, they will get a certificate noting their achievements. After all, a state record doesn't come along every day.

1978 Contest Winners

Largemouth Bass
Link Henderson, 10-2⅓/Harrell's Lake, April 1, 1978
Smallmouth Bass
Beau Turner, 5-4/King Catfish Lake, October 7, 1978
White Bass
Mike Gozdick, 3-2½/Lake Lanier, March 28, 1978
Striped Bass
Bob Mobley, 22-4/Jackson Lake, March 27, 1978
Bluegill
Frank Littleton 2-1/Pond #4, May 26, 1978;
Thomas E. Yeary, 1-8/Private Pond, November 12, 1978
Redear Sunfish (Shellcracker)
McAdoo Shepherd, 2-10 / J. M. Shepherd Pond, May 29, 1978
Walleye
Gene Crump, 8-3 / Lake Lanier, April 20, 1978
Carp
John E. Brown, 20-4/Lake Doren, July 12, 1978
Channel Catfish
Kermit DeLoach, 29/Altamaha River, December 9, 1978

Georgia Records

BASS, LARGEMOUTH
WORLD RECORD
22 lbs., 4 oz.—George Perry
Brunswick, Montgomery Lake
June 2, 1932
Minimum Weight for Certificate· 10 lbs.

BASS, SPOTTED (KENTUCKY)
7 lbs., 12 oz.—Robert Kincaid
Blue Ridge, Lake Nottely
March 8, 1972
Minimum Weight for Certificate: 5 lbs.
World Record: 8 lbs., 10½ oz.

BASS, SMALLMOUTH
7 lb., 2 oz.—Jack Hall
Cleveland, TN, Lake Chatuge
March 28, 1973
Minimum Weight for Certificate· 5 lbs.
World Record: 11 lbs., 15 oz.

BASS, SHOAL (ALSO "FLINT RIVER")
WORLD RECORD
8 lbs., 3 oz.—David Hubbard
Thomaston, Flint River
October 23, 1977
Minimum Weight for Certificate: 5 lbs.
This fish is listed by *Field & Stream* as a world record redeye bass

BASS, REDEYE (COOSA)
2 lbs., 10 oz.—John R. Cockburn, Jr.
Dalton, Jacks River
July 4, 1967
Minimum Weight for Certificate· 2 lbs.
World Record: 8 lbs., 3 oz.

SUWANNEE RIVER BASS
3 lbs.—Tommy Lee Cooper
Ochlocknee River
May 5, 1974

BASS, WHITE
5 lbs., 1 oz.—J. M. Hobbins
Atlanta, Lake Lanier
June 16, 1971
Minimum Weight for Certificate: 3 lbs.
World Record: 5 lbs., 5 oz.

BASS, STRIPED
63 lbs.—Kelley A. Ward
Dublin, Oconee River
May 30, 1967
Minimum Weight for Certificate: 20 lbs.
World Record: 72 lbs.

BLUEGILL
3 lbs., 5 oz.—P. F. Gumm
Atlanta, Shamrock Lake
July 19, 1972
Minimum Weight for Certificate: 1½ lbs.
World Record: 4 lbs., 12 oz.

SUNFISH, REDEAR (SHELLCRACKER)
3 lbs., 6 oz.—Terry Sapp
Macon, Ocmulgee River
July 3, 1975
Minimum Weight for Certificate: 2 lbs.
World Record: 4 lbs., 8 oz.

SUNFISH, REDBREAST
1 lb., 4¾ oz.—Julius Williams
Douglas, Satilla River
May 7, 1977
Minimum Weight for Certificate: 1¼ lbs.
No World Record

WARMOUTH
WORLD RECORD
2 lbs.—Carlton Robbins
Sylvania, Private Pond
May 4, 1974
Minimum Weight for Certificate: 1 lb.

CRAPPIE, BLACK
4 lb., 4 oz.—Tie:
Shirley Lavender
Athens, Acree's Lake
June 1, 1971
Steve Cheek
East Point, Lake Spivey
March, 1975
Minimum Weight for Certificate: 3 lbs.
World Record: 5 lbs.

CRAPPIE, WHITE
4 lbs., 11 oz.—Lewis I. Little
Macon, Brickyard Lake
May 31, 1972
Minimum Weight for Certificate: 3 lbs.
World Record: 5 lbs., 3 oz.

TROUT, BROOK
5 lbs., 5 oz.—James Harper
Austell, Waters Creek
September 3, 1973
Minimum Weight for Certificate: 15" or 2 lbs.
World Record: 14 lbs., 8 oz.

TROUT, BROWN
18 lbs., 2 oz.—William M. Lowery
Marietta, Rock Creek
May 6, 1967
Minimum Weight for Certificate: 18" or 5 lbs.
World Record: 39 lbs., 8 ozs.

TROUT, RAINBOW
12 lbs., 4 oz.—John Whitaker
Ellijay, Coosawattee River
May 31, 1966
Minimum Weight for Certificate: 24" or 6 lbs.
World Record: 42 lbs., 2 oz.

PERCH, YELLOW
No Official State Record
Minimum Weight for Certificate: 1½ lbs.
World Record: 4 lbs., 3½ oz.

WALLEYE
11 lbs.—Steven Kenny
Atlanta, Lake Burton
April 13, 1963
Minimum Weight for Certificate: 5 lbs.
World Record: 25 lbs.

CATFISH, CHANNEL
44 lbs., 12 oz.—Bobby M. Smithwick
Vidalia, Altamaha River
May 18, 1972
Minimum Weight for Certificate: 15 lbs.
World Record: 58 lbs.

CATFISH, FLATHEAD
51 lbs., 15 oz.—Hoyt McDaniel
Suches, Lake Nottely
June 2, 1969
Minimum Weight for Certificate: 15 lbs.
World Record: 76 lbs.

MUSKELLUNGE
38 lbs.—Rube Golden
Atlanta, Blue Ridge Lake
June, 1957
Minimum Weight for Certificate: Any Weight
World Record: 69 lbs., 15 oz.

PICKEREL, CHAIN (JACKFISH)
World Record
9 lbs., 6 oz.—Boxley McQuaig, Jr.
Homerville
February, 1961
Minimum Weight for Certificate: 5 lbs.

BOWFIN
16 lbs.—Charles O. Conley
Stephen Foster State Park
May 25, 1976
Minimum Weight for Certificate: 8 lbs.
World Record: 19 lbs., 12 oz.

GAR, LONG NOSE
No Official State Record
Minimum Weight for Certificate: 15 lbs.
World Record: 50 lbs., 5 oz.

CARP
35 lbs., 12 oz.—Rev. Donald Clark
Locust Grove, Lake Jackson
1972
Minimum Weight for Certificate: 20 lbs.
World Record: 55 lbs., 5 oz.

NORTHERN PIKE
13 lbs., 8 oz.—T. G. Dunn
Tallulah Lake
June 30, 1978

REDFIN PICKEREL
1 lb., 8 oz.—Tillmon Booth
Surveyor's Creek
May 24, 1977

SAUGER
3 lbs., 1 oz.—Rondell Kerbin
Clark Hill Lake
March 11, 1978

BROWN BULLHEAD
5 lbs., 8 oz.—James William Andrews
O. F. Neal Pond
May 22, 1978

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Kim Primmer, Supervisor **Gary Beisser**	Calhoun Office P.O. Box 519 Calhoun, GA 30701 (404) 629-1259

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Bob Rees	Richmond Hill Hatchery Richmond Hill, GA 31324 (912) 756-3691

Big Fish Contest Rules

1. Have the fish weighed, measured, and entered at any Game and Fish Division fisheries management office. If this is impossible, have the fish weighed on a certified scale in the presence of two witnesses. Both witnesses and the owner of the scale (if not a witness) must provide an address and phone number. (If the fish is weighed and measured at a Game and Fish Office, the verifying official should sign the blank.)
2. Witnesses must be of legal age, and may not be members of the entrant's immediate family.
3. The truth of the entry blank must be attested before a qualified officer such as a notary public, justice of the peace, sheriff, municipal clerk, postmaster, member of a state or local law enforcement agency, or wildlife ranger.
4. If the fish is not weighed and measured at a Game and Fish office, the fish must be frozen whole and maintained for 30 days from the date of postmark on the entry blank. This is for identification purposes. At the expiration of this 30-day term the entrant may assume that there is no question, and may dispose of the fish in whatever manner he desires.
5. No fish will be accepted as a state record unless verified by a Fisheries Biologist.
6. Mounted fish are not suitable for identification. No potential state record or contest winner will be verified after it has been mounted.
7. Judges reserve the right to inspect any fish entered in this contest, and the right to take any fish to another authority for identification. Judges reserve the right to disqualify any entry which does not fulfill the rules set forth.
8. The judges of this contest are the Executive Director of the Georgia Wildlife Federation, the Editor of **Outdoors in Georgia** magazine, and Fisheries Biologists of the Game and Fish Division of the Department of Natural Resources. Decisions of the judges will be final.
9. Neither the Department of Natural Resources, the Georgia Wildlife Federation, nor any of their designees will be responsible for loss or damage to fish entered in this contest.
10. Contest prizes from Garcia and Pflueger will be awarded annually to: the largest largemouth bass, white bass, bream, trout, and the holder of any state record taken in the contest year.
11. In case of multiple records in a single season, the last record holder for that year will receive the prize. All record-breaking entries will be identified and the angler awarded a certificate.
12. The name of the annual winners in the largemouth and white bass contest, the weight of their fish, and date of catch will be inscribed on trophies kept at the Atlanta office of the Department of Natural Resources.
13. Fish caught after December 31 will be entered in the following year's contest. Entries should be made as soon as possible after the fish is caught. The deadline is January 15.
14. There is no entry fee.
15. Any angler, resident or non-resident, who holds a valid Georgia fishing license, may enter the contest by completing the official entry form.
16. Fish must be caught on sporting tackle, and be hooked and landed by the entrant.
17. Fish must be caught in the State of Georgia during the legal angling season for the species taken, and in observance of all pertinent fishing laws and regulations.
18. Any angler may submit as many entries as he wishes. Certificates will be awarded for all fish surpassing the minimum standards in the chart regardless of the year caught, but contest prizes will be awarded only in the season immediately past. In the event of a tie, duplicate awards will be given.
19. A clear, sideview, black-and-white or color photograph of the fish, preferably with the angler, must be submitted with each entry. This photo becomes the property of **Outdoors in Georgia**.
20. Affidavits should be mailed to Big Fish Contest, **Outdoors in Georgia**, Room 719, 270 Washington Street, Atlanta, GA 30334.

PRINT OR TYPE ALL INFORMATION

Kind of Fish______________ Weight ______lbs. ______ozs. Length ______in.

Girth ______in. Bait Used______________ Type Tackle______________

Where Caught (name of lake or stream)______________

Location of Lake or Stream (county or nearest town)______________

Date Caught______________

Angler______________

Home Address______________

City and State______________

Telephone Numbers: Business______________ Home______________

Fishing License Number:______________

"I hereby swear that the above statements are true; that in taking this fish I complied with the contest rules and Georgia State Fishing Regulations, and that the witnesses hereto saw this fish weighed and measured. I consent to the use of my name in connection with the Georgia Big Fish Contest."

____

(Signature of Angler)

We, the undersigned, witnessed the weighing and measuring of the fish described above and verify the weight and measurements given.

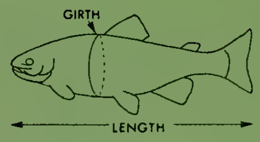
1. Signature______________
   Address______________ Phone______________
2. Signature______________
   Address______________ Phone______________
3. Owner of scale______________ Phone______________

Sworn to and ascribed before me this ________ day of______________, 19____

____________________________ Title:______________

(Signature of a qualified officer—see rule 3)

Send all entries to: **Outdoors in Georgia**, Room 719, 270 Washington Street, Atlanta, GA 30334.



HOW TO MEASURE A FISH: Girth should be measured around the largest part of the body as shown in diagram. Length: Measure along a flat surface from the extremity of the mouth to the extremity of the tail.

Outdoors in Touch

edited by Susan K. Wood

Sam Cofer (left) and Wimbric Walker (right)

WIMBRIC WALKER ELECTED BOARD CHAIRMAN

J. Wimbric Walker of McRae is the new chairman of the Board of Natural Resources. Walker, who represents the Eighth District, has been a member of the Board since 1975. He succeeds Lloyd L. Summer, Jr., of Rome.

Elected as vice-chairman at the January Board meeting was Sam Cofer of St. Simons Island. Cofer has represented the Coastal District since March 1976. The newly elected secretary of the Board of Natural Resources is Mary Bailey Izard of Atlanta. Mrs. Izard, who represents the Fifth District, is beginning her sixth year on the board.

NATURAL RESOURCES CONSERVATION WORKSHOP

Again this year, Georgia youths between the ages of 15-18 will have the opportunity to participate in a Natural Resources Conservation Workshop sponsored by the Georgia Chapter of the Soil Conservation Society of America and the Georgia Association of Soil and Water Conservation District Supervisors. In past years, two workshops have been held annually. Last year, each had approximately 140 participants. This year, however, there will be only one workshop with an expected participation of 275-300 young people.

The workshop is scheduled the week of June 17-22 at South Georgia College in Douglas.

Workshops have been held for the past 18 years and have been instrumental in pointing numerous young people toward a career in one of the many fields of natural resources conservation.

Douglass Pope of the Soil Conservation Service in Albany is workshop director. Counselors and instructors are professionals representing numerous state and federal conservation agencies.

According to Pope, "Not only is the week full of fun and excitement for the participants, but also they have the privilege of sharing with top-flight representatives of all the various state and federal conservation agencies. Through personal contact and specific classroom instruction, each student leaves the workshop having been exposed to the duties and responsibilities of each agency, whether it be wildlife conservation, soil conservation, forestry or whatever."

Classroom instruction covers all the areas of natural resources conservation such as soil and water conservation, wildlife management and law enforcement, forest protection and much more. Also, during field trips the students see first hand how fisheries biologists conduct balance checks on farm ponds, how game biologists capture wild turkeys with a cannon net, or some similar management techniques.

At the end of the workshop, many prizes and awards are presented to the most outstanding participants. The student who obtains the highest academic score during the week is awarded a college scholarsrip.

The cost per student for the workshop is $55. However, this expense is met by local sponsors in each county. If you would like an application for the Natural Resources Conservation Workshop or would like to sponsor a young person, contact one of the following agencies:

Soil Conservation Service
County Extension Service
U.S. Forest Service
Georgia Forestry Commission
Conservation Rangers of the Georgia Department Natural Resources, Game & Fish Division.

GEORGIA ORNITHOLOGICAL SOCIETY'S SPRING WORKSHOP

The Georgia Ornithological Society has planned a special weekend of bird study, scheduled for April 20-22 at Valdosta State College. The programs are designed for beginning bird watchers as well as more experienced birders.

The weekend will get underway Friday evening at 8 p.m. in the Regional Education Center with an illustrated lecture by Dr. Bill Cribbs on the Okefenokee

Swamp. Saturday will feature guided field trips and a presentation on Florida's Corkscrew Swamp bird sanctuary operated by the National Audubon Society. On Sunday, additional field trips are planned.

Registration is $3 per person. For more information, write Franklin McCamey, Georgia Ornithological Society, 4676 Andover Court, Doraville 30360.

SPECIAL EVENTS IN APRIL

DNR's Parks, Recreation and Historic Sites Division begins a full schedule of programs and special events in April. For more information, call (404) 656-7092 or the parks listed below.

Outdoor Skills Workshop

Fort Mountain State Park
April 6-7

Canoeing, map and compass use, survival, backpacking, rock climbing, camp cookery and outdoor safety are a few of the skills you will see demonstrated. Chatsworth. (404) 695-2621

Environmental Education

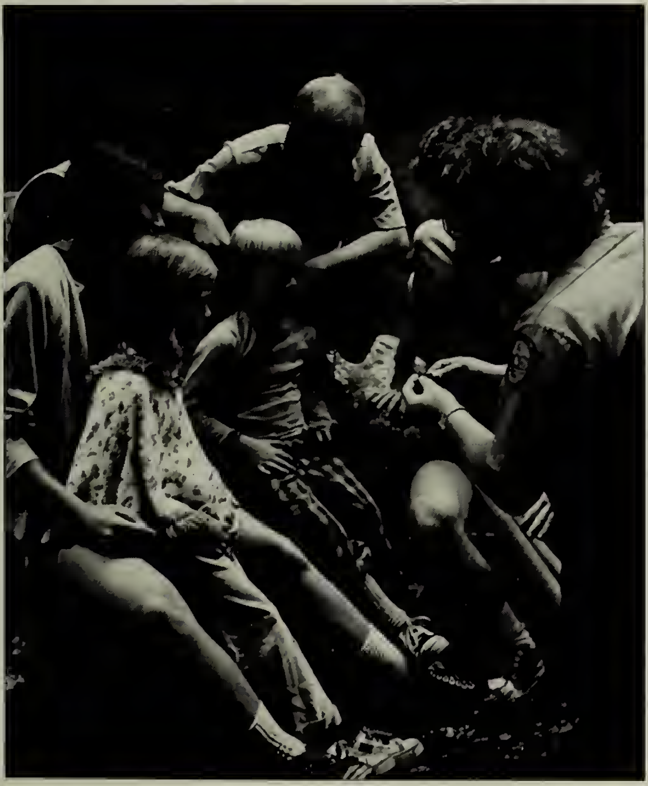
Unicoi State Park
All month

Special arrangements can be made to provide your school, scout or youth group with a leader to assist in interpreting the flora and fauna of Unicoi State Park. Reservations are required. Helen. (404) 878-2201

Discover Skidaway

Skidaway Island State Park
April 6-8

Learn about the natural history of this inland barrier island where you can see a variety of wildlife including warblers and songbirds starting their spring migration and wading birds feeding in the salt marsh. Savannah. (912) 352-8599



Basket Weaving Festival

Midway Museum
April 7-8

Demonstrations of basket weaving with various natural materials and different designs. Midway. (912) 884-5837

And That Was The Way It Was?

Kolomoki Mounds State Park
April 6-8

From evidence gathered by archaeologists we can piece together what the life of the Kolomoki Indians was like. See for yourself. Blakely. (912) 723-5296

Rural Springtime

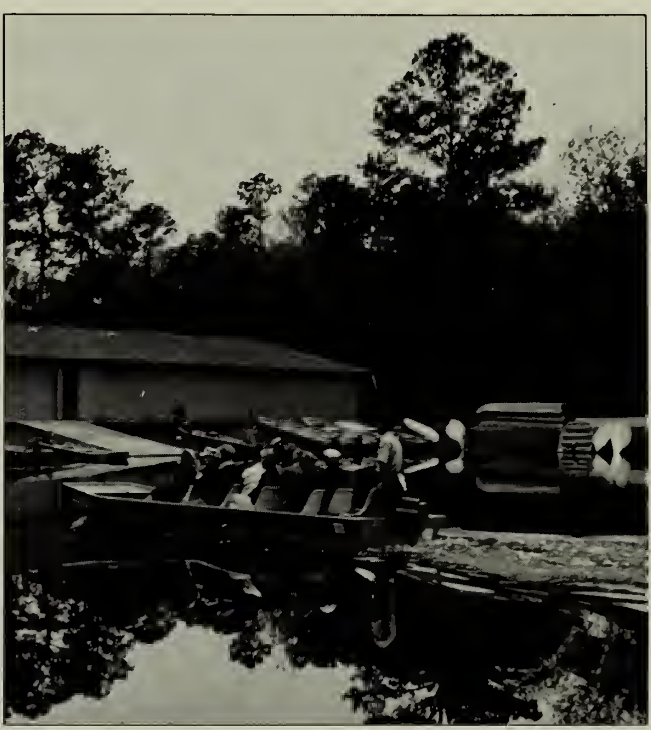
Jarrell Plantation
Every weekend in April

Spring activities on the farm. The mule will be hitched to the plow and planting will be going on. The steam engine will be in operation, and you can also see demonstrations of blacksmithing, soapmaking, sewing, quilting. Juliette. (912) 986-5172

Spring Wildflowers

Providence Canyon State Park
April 21-22

Rhododendron, mountain laurel, trillium and other wildflowers will be in bloom in the canyon, called Georgia's "Little Grand Canyon." Lumpkin. (912) 838-6202



Birding in the Okefenokee

Stephen C. Foster State Park
April 27-29

DNR naturalists will take you on tours of the swamp where you can see some of the swamp's many bird species as well as alligators and swamp flowers that will be in bloom. Birdwalks, boat tours and birding workshops. Fargo. (912) 637-5274. Gates open from 6:30 a.m. until 8:30 p.m.

Black Rock Mountain Discovery

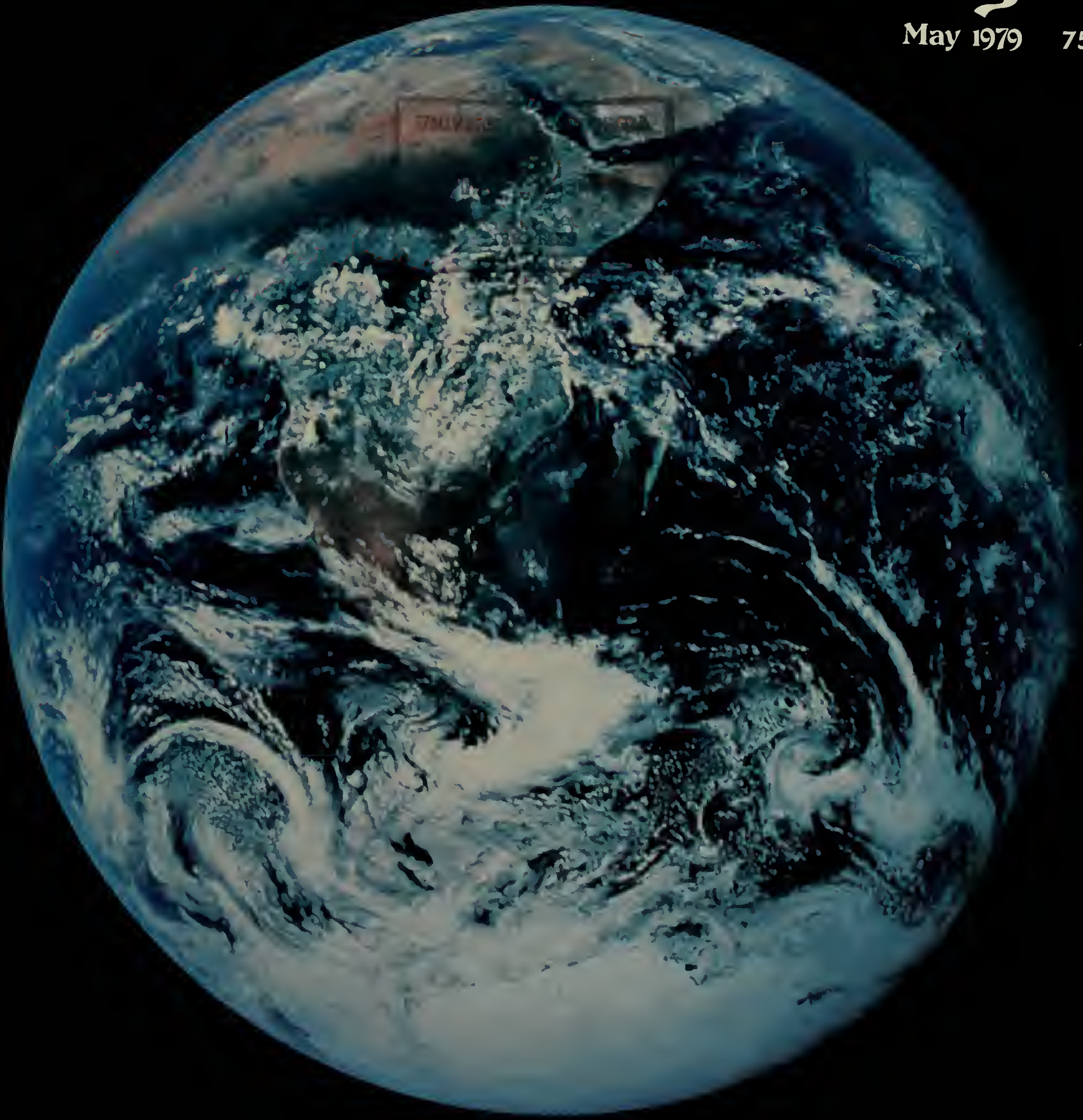
Black Rock Mountain State Park
April 28-29

Workshops and field trips with staff naturalists will help you discover Georgia's highest state park. Spring wildflowers, migrating birds and animals reviving from a winter hibernation will highlight the weekend. Mountain City. (404) 746-2141

CURRENT
PERIODICALS
SCIENCE

Outdoors in Georgia

May 1979 75¢



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ABOUT THE COVER: In this month's issue, you'll find a powerful ecology message in "Eugene Odum—The Architect of Modern Ecology," page 3. We thought this cover properly set the stage for serious consideration of the earth and our relationship with it. Photo by NASA.

BACK COVER: From *A Sand County Almanac with other essays on conservation from Round River* by Aldo Leopold. Copyright© 1949, 1953, 1966, 1977 by Oxford University Press, Inc. Reprinted by permission.

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Change of address: Please allow 8 weeks for address changes to become effective. Send old address as well as new address (old mailing label is preferred).

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1776

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Outdoors in Georgia
To Cease Publication

Outdoors in Georgia magazine will cease publication with the June 1979 issue. This action has become necessary in order to continue the legally mandated programs of the Department of Natural Resources within a greatly reduced budget for next year. This action became final when the legislature approved the Governor's budget in March with no provision for additional funding for the magazine.

Since March we have been returning all new subscriptions, but this is the first opportunity we've had to notify you. For those of you whose subscriptions extend past June 1979, the Department will issue refund checks pro-rated against the number of months left in your subscription.

We want to thank you for reading our magazine and for the relationship we have enjoyed over the years. We have tried to bring you the very best magazine we could produce and we hope you've enjoyed it.

The editors and staff.

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Outdoor Commentary

The Blueprint

Recently as I read one of H. L. Mencken's many derisive accounts of the "Scopes Monkey Trial" in Dayton, Tennessee, I became convinced that science may well be a scientist's second most important job. Indeed, the research and experimentation for which the scientist has years of specific training may be the easier portion of his life's work. The hard part may be convincing a stubborn, materialistic, and, yes, even ignorant world that what has been discovered is (1) true and (2) applicable.

In this issue we examine Dr. Eugene Odum, a scientist whose work may be fully as important as Darwin's. For as Darwin was the first to give us a comprehensive account of how things got the way they are, Odum has described how they work. For centuries there has been a vague understanding that living things interact with each other in a more-or-less harmonious relationship if left alone. This was recognized not only by scientists, but also by philosophers, poets, and even by common men who dealt on daily terms with nature. To describe this relationship by the traditional terms of habitat, food habits, reproduction would have been an immense task, which is probably why no one ever did it.

Odum did explain the relationships, but he avoided the tedious examination of everything under the sun. Instead, he went directly to the basic common currency of all living things — energy. His model, based on energy exchange, depicted in terms of energy gains and losses what we have always called the Balance of Nature and was a basic formula which could be applied to any system. He provided a blueprint for how the thing works.

Dr. Odum has never been hauled into court to defend the validity of his principle as was the teacher, Scopes, for teaching Darwin's theory, but neither has his work gone unchallenged. Basic validity has never been the point so much as specific applicability to existing environmental problems. Industrialists and corporate leaders who would give glowing testimonials to our famous Dr. Odum from any rostrum also hire platoons of lawyers to prevent the application of his principles to their business.

Legally proving the applicability of scientific principle to the real world of profit and loss *is* a drawn-out and tedious process which will go on for a long time. Let us hope that it will occur soon enough to prevent major problems. However, in the meantime we should thank Eugene Odum for providing the methodolgy.

Aaron J Pass

By the way, what ever happened to the environmental thing?

"This is
the environmental thing."

Dr. Eugene Odum

Eugene Odum

The Architect of Modern Ecology

By Lucy Justus

As we left the Institute of Ecology in Athens, I waited eagerly for photographer Bob Busby's reaction to the man he had just met. Earlier I had bet myself I could predict it.

"You know," Bob said, "he makes me ashamed of being a member of a society that's so wasteful."

Eugene P. Odum had done it again—as I had bet he would.

Beginning with a normally sensitive stranger, he had fascinated, charmed, and — gently, without preachiness or lecturing — touched something deep and responsive, evoking a feeling of concern and personal guilt.

Thousands of other people have responded similarly to the eloquence, wit and wisdom of the man very appropriately called "the father of modern ecology." Dr. Odum maintains that man and nature should be considered as a whole, not as a group of separate, unrelated parts, and that we need to act and manage resources on that basis. He pioneered the concept of holistic or ecosystem ecology as we know it.

Dr. Odum, in 1953, wrote the world's first ecology textbook. His *Fundamentals of Ecology* has been translated into many languages including Russian, Japanese, German and Portuguese and is now in the third edition. The book is still the definitive work on the subject. His writing also includes four other books, more than 250 scientific papers, and numerous essays and semi-popular articles.

Dr. Odum was among the first to use radioactive tracers in the study of food chains, and he and his brother Howard, also an eminent scientist, were among the first to recognize the importance of energy flow, not only as a principle of ecology but as a means of evaluating the useful work of nature. Dr. Odum's early research opened an entirely new frontier on the role of marshlands and established the fact that some marshlands are worth $50,000 or more an acre. His studies of migratory birds provided an understanding of the role of fat deposits as fuel for prolonged flights.

Dr. Odum established the Marine Institute on Sapelo Island and the Institute of Ecology, which he directs, at the University of Georgia. The institutes have attracted high-caliber staff and students, making the University internationally known in the field. Dr. Odum has twice been appointed to special chaired professorships, the Callaway Foundation Professor of Ecology and Alumni Foundation Distinguished Professor of Zoology. His regular schedule includes teaching, the supervision of graduate students, research and service, the service frequently taking the form of advice and assistance to governmental agencies. And he is an extraordinarily popular speaker who receives far more invitations than he can accept.

In all these roles, Dr. Odum has always been a strong and outspoken defendant of environmental quality. Long before the National Environmental Policy Act was passed, he urged that careful studies be made of channelization, clearcutting, strip mining, superfluous dams and the uncontrolled use of persistent pesticides. He was among the first to speak out against insidious development of beaches, marshes and river floodplains, and one of the first forceful advocates of population control and land use planning.

In confrontations with perpetrators of environmental degradation, Dr. Odum is an awesome opponent who uses wit as a surgeon uses a scalpel and facts as a Saxon might wield a battleaxe. But he strives for understanding rather than mindless surrender. Education, not only of students but decision-makers and the public as well, is, Dr. Odum emphasizes, the most important activity of his Institute. In 1975, the Institute began a series of workshops and short courses in basic environmental principles for professionals in governmental agencies. As a result of these classes, at least two federal agencies curtailed some of their environmentally disruptive activities. Dr. Odum hopes industry will soon follow suit.

Dr. Odum holds the two highest international awards in the environmental field, the Tyler Award, presented in 1977, and the 1976 Prix de l'Institute de la Vie. He donated the $150,000 which accompanied the Tyler Award to the University to start an endowment for the Institute of Ecology.

Professor, author, lecturer, internationally honored scientist, advisor to governments and recipient of two equivalents of the Nobel Prize, Dr. Eugene Pleasants Odum is a quiet-voiced, unpretentious man who occupies an undistinguished office, smaller than that of many secretaries.

He is a lanky blond with a quick smile, merry blue eyes, and a wide range of interests, a gentle person who decided long ago that, wherever else in the world he might go, he would not visit certain places where conditions were so bad he might lose his natural optimism about the future of man.

He talks fast, thinks faster and has little use for jargon or current catchwords, preferring the type of plain English that is readily understood. His conversation and formal presentations sparkle with humor, lively phraseology and — very frequently — startling statements intended to shock the listener into attention and reflection.

"Thank goodness for the energy crisis," Dr. Odum said recently. "Every day the energy cost creeps up, the better off we are going to be. It is going to make us come back to the real values of life and make choices based on human rather than materialistic values."

Always an opponent of uncontrolled growth, he reasons that if we are forced to reduce our fuel consumption, we will reduce our growth and, with it, our need for things which are currently destroying our life support system and reducing our quality of life. Additionally, he says, the economy will be more stable, our health will profit from the lowered pollution, and the less-consumptive lifestyle will prompt a return to more human values.

Growth, Dr. Odum says, is natural and desirable only up to a point. Then, according to the laws of nature, it must slow down and stop, in a city as it does in a person. If it does not, it becomes malignant, a "cancer" which consumes its host.

"If we continued to have cheap energy, we would overpopulate the world for sure because it would give everybody expectations that there are no limits," Dr. Odum said. "A society that thinks there's no limits will destroy itself with excesses of one sort or another."

In illustration, he uses "Calhoun's Nightmare," a study of rats confined in a finite space with abundant food and water. The overpopulated colony developed sexual perversions and other aberrant forms of behavior, eventually killing their own young and murdering each other. While people like to think themselves "more civilized" than Dr. Calhoun's rats, certain parallels can be drawn in overcrowded human populations.

"It is better for the organisms if there is not so much food," Dr. Odum said. "They don't waste it. They know, or at least respond to, their limitations in order to survive. They don't have so many young. They take care of the young they have. For man, too many artificial goods and services, which use up future resources, can prevent this natural slowdown from occurring. It's the old common sense of 'look before you leap.' All the ecology laws are reflected in the common sense that is part of our heritage. Everybody already knows all these things. We just don't practice them. We become temporarily blinded by the prospect of short term wealth which can be obtained by exploitation. A good energy crisis can wake us up to the fact that there is a tomorrow."

Then, stripping away the science and glamour, he condenses the seemingly complex and once-revolutionary concept of ecology into adages: Haste makes waste. Save for a rainy day. Don't put all your eggs into one basket. A stitch in time saves nine. . . .

And, although he doesn't mention it, there is one which says much about the man himself: "It's an ill wind that blows no good." While some people — usually those who want to do something atrocious to the environment — have depicted him as a prophet of doom, Eugene P. Odum is a confirmed optimist.

He finds hope not only in the energy crisis but in the financial problems of large cities. Our big cities, he says, will go broke, following the trend set recently by New York and Cleveland and, long ago, by other cities. But when this happens, he says, if we manage wisely, we will simply go back to smaller, lived-in cities where the taxes are lower and the quality of life higher.

"Growth always levels off, just as it does in your body," Dr. Odum said. "The smaller you are, the faster you grow, but the bigger you are, the slower you grow and soon you have to stop. Cities are the same way. They can't keep on growing. Yet the economic system is based on the fact that money is only made when you are growing. So it's a stupid system we have gotten into because we have always had a chance to grow, or thought we did."

The system, he observed, fails to recognize the fact that, after a point, growth leads not to economic gain but to economic chaos. Taxes paid by the average citizen finance growth — the streets, schools, sewers, water mains, police and fire protection for new suburbs, shopping centers and industrial complexes. As growth continues, this becomes an enormous burden, leading ultimately to a situation where only the rich get richer. The poor pay higher and higher taxes for fewer and more inefficient services — until they wake up. Then they either revolt and change the government or kill off the rich.

Studies, Dr. Odum says, have shown that when the size of a city doubles, the cost of maintenance and operation quadruples in what is known as the "inverse square law." After a city attains a population of 100,000-200,000, it acquires various kinds of environmental and social pollution which begin to erode the quality and cultural gains, and eventually the economic gains go down. Thus, the well-known "economies of scale" advantages of size are gradually replaced by "diseconomies of scale," or being too big to manage.

"People have been thinking if there are limits to our growth or limits to our size or limits to Atlanta, they would be physical limits — not enough water, not enough food, not enough space or something," he said. "But a book that came out recently, called *The Social Limits of Growth,* makes the point that those limits ultimately may be social, not physical.

"Most people would rather live in a city the size of Savannah or Macon than the size of Atlanta. But there is more money to be made in Atlanta so the economics drive you to accepting a lower and lower quality of life until finally you get mad and leave the city, which thousands of people do every day. They find a place somewhere else if they can, but thousands of them become trapped in the slums. Those who can't escape, commute and use the city as little as they can. The result is they don't go to the office if they can help it, they don't work very well and they eventually become concerned only with drowning their troubles in drugs or alcohol.

"When you get too many people crowded together, the system breaks down — self destructs. There is a thermodynamic law that says as you build up concentrated power and organization, there is an increasing tendency for it to break down under its own weight. You always have to recognize this and work hard to counter the tendency. The social and economic costs of doing so eventually become so high the city is no longer efficient and it disintegrates— just as cities have in the past. There have been no cities that haven't gone through these cycles of boom and bust, but people refuse to face this.

"Society is drugged or addicted to high energy consumption just like it is addicted to uppers," Dr. Odum observes. "It is addicted to a high rate of stimulation which inevitably has depression at the other end of it. In other words, after you get through with the big high you're going to have a big low. The boom and the bust are really frightening and it is dangerous because if you bust too hard you may not get out.

"People keep thinking the President is somebody who ought to get us out of this dilemma but it is not him. It's us. If President Carter really wants to do something about it, he really can't because big business will destroy him anytime they want to and see that a highly conservative president gets in. When people are scared, they vote for the person who says, 'I will keep it the same. I'm going to do nothing,' or 'I am going to return to the past where everything was nice and simple.' Changes have to be made at the people

Jimmy Valent

level, so we can all face the changes and transitions that have to be made if we are to survive."

Will we change fast enough to avoid disaster?

"It's a race," Dr. Odum said. "Can we make it fast enough not to get caught some place? You can't change a system overnight. Young people thought in the early seventies if they fussed and protested we might make a sharp turn away from suicidal consumption and destruction of the environment, but you can't make a sharp turn when you are going 80 miles an hour. You have to slow down first.

"Most economists are predicting a pretty good worldwide slump in the next few years which could actually be a good thing, a sort of rest period where the countries will quit their mad pursuit of goals, both materialistic and militaristic, that are no longer attainable. Maybe it will make us look at and consider our environmental quality values and human quality values which we temporarily overlook or forget when we are obsessed with the pursuit of materialistic goods."

One thing we must change is our attitude toward energy.

Dr. Odum cites a recent study which challenges the theory that quality of life increases as energy consumption increases. "Up to 1955, adding to our energy consumption did seem to increase our quality," he said. "Our health got better, we got more more hospitals, more schools . . . . There is very definite evidence that in 1955 we were better off than we were in 1925, but we are not any better off in 1979 than we were in 1955.

"You just think. How are we better off? Our health is about the same. The average citizen does not get very good medical care. He's overweight, he's cancerous, he's breathing poison gases, and so on. In the U. S. we don't live any longer or any better than people in other countries that use less energy per capita. There is no advantage for a person to consume more energy than he is consuming right now. There might be some big advantages, and it might improve our quality of life, if we consumed less more efficiently.

"People are extremely resistant to any idea of being more efficient. And it costs a lot to change— to insulate your house and put a little solar energy in it. But people will begin to do it as soon as the price of fuel or electricity goes up.

"The price of natural gas is going to jump. Governments have held it down to a ridiculously low price in order to stimulate industrial use and growth. It is the highest quality energy source we have and the scarcest, so it is stupid to keep the price so low. It encourages people to waste it. If something is cheap, you do not respect it. You waste it.

"The period of cheap energy may be a very brief period in history. The Age of Petroleum is only about 50 years old and in that 50 years we have tripled the world population and increased our energy consumption 10 times. Human values have not improved that much. We don't have a 10-times better world, and there is no immediate substitute for oil and gas.

"Energy is the common denominator for man and nature. Man uses money. Nature's currency is energy. Man's currency really is energy. We just use money as a convenient exchange thing. This is something most people don't realize. The main reason we have inflation and will continue to have inflation throughout the world is because energy costs are going up.

"Our currency is being inflated in the sense that it costs more money to do a given amount of work. If you have a unit of energy capable of doing X amount of work and that energy cost a dollar last year and now costs two dollars, obviously you have inflation. Monkeying with the monetary adjustments, the things traditional economists do, is not going to do anything but sort of quick-fix it — postpone the inevitable time when you have to accomplish your work on half the amount of energy.

"I think many long-range, long thinking economists would agree that we are going to have to make some changes. We are going to have to be more efficient and we are going to have to use energy wisely. We have been saying this for years; but people don't do it because they don't see beyond today. Or maybe they have the fatalistic thought: 'I'm going to enjoy myself before the doomsday comes.'

"Energy is not recycled," Dr. Odum continued. "Energy cannot be recycled. That's a physical law. Therefore, you have to have new energy every minute. All the time. So energy becomes the limiting factor in everything.

"Energy problems will continue. We will never have it where we can just forget about it. To obtain enough energy and use it efficiently and get good work out of it and avoid disorder is a problem forever, and always has been.

"Man has always had a problem with energy — usually not enough food. Rome had its energy crisis, from which it never recovered, when it ran out of wood, the only source then known. Now we may have the same problem with oil. It's not something you cure like a disease and then forget. It's not a crisis; it's a continuing problem. It is a crisis only if we fail to recognize it as the foremost problem of our society. Energy is tied in with everything else — social values, environmental values, pollution . . . ."

Dr. Odum smiles somewhat sadly about reporters who come to discuss energy with him and, in leaving, casually ask, "By the way, what ever happened to the environmental thing?" "This," he tells them, "*is* the environmental thing." Dr. Odum's philosophy is based on the theory that everything is the environmental thing. Everything is one thing — with many parts. And those parts encompass a

diversity that extends from water, air and rocks through economics, sociology and politics.

"At the moment, our problems with the environment are not technological, biological or scientific," he said. "Eighty percent of them are political, economic and social. Therefore, we as ecologists must get into that aspect just as much as we get into the scientific aspect." One of Dr. Odum's primary interests on the academic level is developing an integrative synthesis of social and natural sciences.

And, just for the record: close to 20 years ago, as part of "the environmental thing," Dr. Odum was preaching the conservation of fossil fuels to postpone the inevitable shortage. He predicted that we would eventually use up our fossil fuels and observed that if we built smaller cars and drove them slower, the supply would last much longer. The energy situation is one to which he applies the adage: Haste makes waste.

What should we do now?

"The wealth we still have ought to be used to design for the future instead of bleed the past," Dr. Odum said. "While we still have oil and coal, and energy is relatively cheap, we should be using it to prepare for new technology, new ways of doing it. We are not going back to the caves and we can't go back to Jeffersonian agrarian times. The population is too large. Maybe we will use less energy, as we once did, but we will use it in a different way and a better way and as far as anybody can see, it will not have to be doomsday."

But he cautions against complacency. "Too often the rationale is that any resource you run out of, technology will find a substitute for," he said. "That holds good for many resources. We do find substitutes. But there are some basic things for which there are no substitutes as far as anybody knows. There are no substitutes for energy or water or human values. Man does not and cannot create any vital resource whatsoever. All he can do is find resources and use them wisely."

It is a mistake, he says, to think blithely that before fossil fuels are gone, atomic energy will have become a panacea. Presently, atomic energy is uncertain as to its effects and too expensive to be feasible on a large scale. According to Odum's Law, which Dr. Howard Odum, Eugene's brother, promulgated, it requires energy to produce energy and it is the net result, or net energy, that counts. Currently, there is a question as to how much net there is in atomic energy. A lot of fossil fuels are required for mining, processing and enriching uranium to produce electricity from atomic fission. Without oil and coal, very little electricity could be made from atomic energy alone. Dr. Odum believes there is a good future for atomic energy, but he points out that it could prove socially unacceptable for health or other reasons.

We must also recognize the difference between quality and quantity, Dr. Odum says. We have available an enormous quantity of solar energy, for instance, but converting it to high quality forms for efficient use is the problem.

Although the shortage of fossil fuel is the current newsmaker, it is only one of many environmental problems we should be considering, Dr. Odum says. Others include water, food and open space.

The South will continue to grow for a few more years, Dr. Odum said. "Business will come down here because it's a little cheaper. The southerner is eager for work so the level of wages is somewhat lower, and we are not yet quite as fussy about waste as more populous regions are. Unless we have some changes of public opinion, we could grow willy-nilly, without any plans, until pollution and other problems reach the same levels as in regions which are now in economic decline. It is important that the southern tradition of love and respect for the outdoors be continued and reinforced legally and by public opinion."

Dr. Odum would like to see about one-third of the land in the South set aside as life support buffers in and around developed areas. And, he says, we should select with great care the industries we do accept. For small towns, several small industries, with little automation and many jobs for unskilled workers would be preferable to, say, an oil refinery. Refineries, he contends, are highly automated, employing relatively few people, and most of the money goes to residents of other states. Without careful planning, the South could end up with something similar to the Boston-Washington strip city which Dr. Odum believes will rapidly evolve into an overgrown, crime-ridden, uneconomical monstrosity from which people flee to the virgin country of the sunbelt. "We should keep our southern cities separated by greenbelts of natural and agricultural land and as a hedge against too much development," he said.

Obviously, our most basic environmental problem is the potential destruction of our life support system. "The difficulty," Dr. Odum says, "is that the market system does not recognize any value unless there is an end product, so the true value of many, many natural areas is undervalued or underpriced in the system, and man-made things like shopping centers are overvalued. We fuss with the economists a lot about that and they admit that in resource allocation there's a 'market failure.' They are busy trying to devise means of doing something about that. One means of doing it is to take these things out of the market place, to say 'This is not for sale because it is necessary for public survival.' Another thing would be to restrict the use. A property owner's right does not include and never has, the right to destroy the property or cause injury to others, as we do by polluting streams. People forget that our laws are founded on British principles which hold that ownership of property is a stewardship, not a license to destroy.

Jimmy Valentine

"If you propose to do away with valuable natural resources — to replace them with something artificial — the burden of proof ought to be on you. You should have to show that there is a long-term public benefit to making the change, and if you can't, then the change should not be made.

"Of course, you run into the unresolved things which are chronic to our society, such as long-run versus short-run values. Future generations aren't here to bid on the property so the values are usually determined by what you can get out of it right now. Take the Chattahoochee River. The future value of that water is going to be extremely high. Atlanta will depend on it. But right now, the value of developing the land upstream, or polluting the water, or doing other things is much higher than preserving it for future generations. It is almost impossible to preserve anything for the future unless public opinion gets very strong. Encouraging things do happen when public opinion becomes strong. In 1968, the people of Georgia decided, through legislative action, that coastal marshes are more valuable in their natural state than in a developed state."

Dr. Odum says that 90 percent of the value of natural resources is not included in our present pricing system. And, for several years, one of his major interests has been an effort to change that system. Currently, he is working to determine the value of wetlands which, in addition to recognized local values, also have a global value through the role they play in atmospheric and hydrological cycles. Some wetlands, however, may have little value. But, as always, Dr. Odum's thought is: Let's find out if it is worth anything, and if so, how much, before we pave it over. "What good is it going to do us to be rich," he asks, "if we end up with chronic respiratory diseases and all these other things that come from damaging our life-support systems?"

It's an interesting question. Dr. Eugene P. Odum is given to posing interesting questions. ●

Catching the early bird

By Steve Hudson
Photos by the Author

It is early morning. In the east the sun still sleeps behind hills and mist, but here a line of figures appears, a purposeful caravan moving slowly over the still-darkened terrain. They carry an odd cargo—some chairs and a table, a nearly invisible net, some books, a briefcase, and a cage and a mouse. Now they stop. Chairs squeak softly as they are unfolded, and a rustle marks the rousing of a rabbit as one dim figure moves through undergrowth to prepare the nets. Another bends to ready the table, setting it with books, a case of metal rings, and an odd assortment of rulers and scales. The cage, now holding one somewhat puzzled mouse, is anchored under a nearby tree, and the preparations are complete. The dawn-dwellers return to the chairs and settle like sentinels, quiet but alert, to wait for the sun and the activity it will bring.

But their wait will not be long, for they have prepared well. They are bird banders, and this day they will catch the early bird.

For thousands of years, even back to the time of royal hawks and Roman empires, people have been marking birds for purposes of identification. But bird banding as we know it did not develop until the end of the nineteenth century when Hans Mortensen, a Danish schoolteacher and amateur ornithologist, began to tag birds as part of his studies. Soon his rings, as he called them, started turning up all over Europe, and banding's popularity began to grow. It took on increasing scientific importance, too, and today it is recognized as a valuable tool for effective wildlife management.

Modern bands—small, numbered aluminum ringlets ranging from tiny versions barely two millimeters across to giants too big to fit your finger—are supplied to licensed bird banders by the U.S. Fish and Wildlife Service. The banders, who must become thoroughly qualified to handle and identify birds before they ever receive banding permits, then put the bands to work.

This year they will band over one million birds in the United States alone. Perhaps 200,000 of those bands will ultimately make their way back to the National Bird Banding Laboratory in Laurel, Maryland where the information that they provide is put to use. For example, if banding data show that the populations of doves, a commonly banded Georgia species, are growing, upcoming dove seasons can be extended without harming the species' population. On the other hand, if it shows that dove numbers are declining below certain levels, seasons might be cut by a few days to insure good hunting in the future.

Certainly bands can shed light on overall population trends. But they can reveal individual surprises, too. Ducks banded in New Mexico have found their way to Japan, and terns banded near the Arctic Circle turned up near Antarctica—a roundtrip

Here Don and Doris Cohrs busy themselves with banding. Below, an immature male Baltimore oriole finds itself caught in the net; it will be gently removed, measured, weighed and banded like the yellow-breasted chat on the opposite page.

journey of over 25,000 miles. And the blackbird singing in that wrinkled old oak may be completing a southbound journey that he started in New York. He may have been practicing that same song for over 14 years.

You never know what will turn up. But first, of course, you've got to have birds.

The sun rises with a burst of light and a clatter of beaks. Already the songbirds are moving, and that racket by the briar bushes says that one of them is caught there in one of the nets.

Rising, the bander goes swiftly to that net to bring back the bird. He moves quickly, lest the heat of the sun or a predator's jaws claim it before him. Now he sees it—an oriole, its orange feathers blazing against the gray-green of morning. Gently he untangles it from the loosely-strung, almost invisible mesh. As he works, another bird (this one a cardinal) flies headlong into the net, too, and suddenly birds are everywhere.

His assistants move to help separate birds from nets and to take them in soft cloth bags to the banding table. There the bander carefully studies each one—weighing it, measuring it, sometimes even looking at the inside of its bill or at its feet. He records his observations in a ledger next to a number; then he grasps the correspondingly numbered band with a special set of pliers and ever so gently clasps it about the bird's lower leg. Now tossing the bird lightly into the air, he watches as it flies to a nearby branch. There it pauses . . . wondering, perhaps, what those odd creatures without feathers are up to now. But it seems to resolve the matter to its satisfaction, and in a moment it is gone.

Suddenly all of the birds are gone. Looking skyward, the banders see why: a hawk is dropping toward a target. The small birds have vanished lest it be one of them, but the hawk is intent only on the caged mouse set out by the banders themselves. Landing on the wire enclosure, he eyes the free meal and tries to find a way to get to it. Too late he notes the banders approaching. He tries to fly, but can't; his feet have become entangled in the loops of nylon fishing line that cover the trap's exterior. Now (and carefully, for he has dealt with talons before) the bander frees the hawk and deferentially bands it, too.

Soon the songbirds return. Now and then a previously-banded bird is captured again; one particularly persistent fellow is caught three times within an hour. Another, apparently wanting to get

(Opposite page) Measuring and other information gathering are what make bird banding such an important activity. (This page) A male cardinal being banded.

in on a good thing, flies into the net, bounces off and regroups, and makes a running leap into it again. Persistence like that should surely be rewarded, and at last he, too, gets his band.

And there are hazards. The small birds are generally harmless, but they are not above a little biological warfare. Almost to the bird, they choose the very moment they are picked up to relieve themselves, but the banders are used to such things. They are devoted, and after all, this *is* science.

So the day continues. If ducks are on the agenda, the banders wll use funnel traps—wire cages with funnel-shaped entrances that birds enter freely but for some reason cannot leave. For other varieties they may use ordinary spring-door traps, and occasionally they must band young birds in the nest.

In any case the work that they do is unique in its importance to both the birds and the biosphere as a whole. As they watch the ebb and flow of avian populations, they indirectly monitor the quality of the planet's lifezones, too. ●

Steve Hudson is a freelance writer and graduate student at the University of Georgia.

If You Find A Band

With an increasing number of birds being banded each year,the likelihood of finding one grows. Should you find a band, carefully straighten it out and return it to the Bird Banding Laboratory; U.S. Fish and Wildlife Service; Laurel, Maryland 20811. With it, send the following information:

- your name and address, legibly printed
- when and how you found the banded bird
- all numbers and letters that appear on the band
- the location, as accurately as possible, where you found the bird.

If the bird is alive, DO NOT try to remove the band. That requires special tools. Instead, write down the band's number and release the bird. Shortly thereafter you will receive a Certificate of Appreciation from the Bird Banding Laboratory along with a brief history of that bird as told by the banding data. Its bander will hear of the discovery, too, and a little more information will go into the computer.

If you would like to participate in banding programs yourself, you will need to be licensed by the Fish and Wildlife Service. Before a license is issued, the prospective bander must have three experts vouch for his abilities at banding and identification. "You need to be thoroughly familiar with birds," says Don Cohrs, an active Georgia bander, and he explains that one of the best ways to gain the needed skills is to apprentice yourself to an experienced bander.

Don and his wife Doris, both bird banders of some note, are glad to help train new banders. If you are interested, contact them at 2446 Jefferson Terrace; East Point, Georgia 30344.

An Angling Legacy

By Liz Carmichael Jones
Art by the Author

This is a story for my mother. "My Mother the Fisherman," I guess it should be called. I only wish she was here to read it, but, you see, she died over a year ago. Several months before that, though, I had told her I was going to write a story about her and her love for cane pole fishing for "Outdoors in Georgia." She laughed and said she didn't think that would be much of a story. Maybe it's not much of a story, but it's a promise fulfilled.

I guess my mother was typical of many Georgia fisherman who have developed a real philosophy about fishing. You don't have to have all that high-priced paraphernalia in order to go fishing, she'd say. A cane pole would do fine.

I was "down home" the other day visiting my father and happened to glance out the windows and glimpsed her fishing pole propped against the big oak tree by the wood pile. I'm sure no one has touched it since the last time she used it. A flood of memories came rushing back.

"Fishing," my mother once told me, "is the greatest therapy in the world. No matter how many problems and worries one has, they seem to disappear while fishing. It is the best way to relax. You should try it. You're too nervous. It would do you a wealth of good."

"Well, I just don't have the patience, Mama. I don't think I could just sit there for hours holding a pole waiting for a fish to bite. I just have to have more to keep my attention," I replied.

"No, there's plenty to do when you fish. You have time to commune with nature, enjoy the outdoors and time to think. It's a quiet time and you can think such beautiful thoughts amid all this solitude. You really should try it," she said.

On past the wood pile is my mother's fish pond on the backside of the property. Daddy doesn't fish so it can't be called his fish pond. Anyhow, he built it for her. She didn't drive a car, so for years Daddy spent hours taking Mama places to fish. He never complained about the going and coming of fishing trips, but I guess they finally concluded it was more convenient for her to have her own pond.

I remember how excited she was when the pond was completed and the Game and Fish people came to stock it for her. This was many years before I started to work with Natural Resources and I suppose the first time I ever heard about the Game and Fish Department. I was truly suprised to learn that this stocking was free of charge. So, when I began my employ with DNR, this stocking program was about the extent of my knowledge of fishing programs. I knew that these people had made my mother and untold numbers of her fishing buddies very happy.

Mama liked sharing her fishing place. Children from all over town would come and fish with her; most of them were, or had been, her students. I will never forget one Christmas when a student of hers gave her a can of worms all tied up with a big red ribbon. On Christmas Day, after she had opened all her fine and expensive gifts from family and friends, she smiled and said what a wonderful Christmas it was and so many beautiful presents she had received, but she thought the best gift of all was from that little boy who gave her a can of worms for fishing!

Having her own pond did not confine her fishing to this one spot for long. She still enjoyed fishing other places and usually knew where the fish were biting best in all the ponds in Butts County. Of course, Jackson Lake was close by and eventually my father started making those fishing jaunts again, taking mama to the lake. But he solved this problem, too. He bought a cabin on Jackson Lake so they could go and spend the night and Mama could get up at 4 a.m. or 5 a.m. or anytime she wanted to, and he could sleep.

She could swap fishing stories with the best of the regulars. She could discuss the best kind of bait at length with anyone knowledgeable about this subject. She had her own worm bed that was as good as anybody's, she said. We never doubted her knowledge about fishing or her deep devotion to this sport. I don't think I've ever known anyone to enjoy a hobby as much as Mama did cane pole fishing.

Some day soon I'm going home again and put that lonesome cane pole propped by the wood pile to use once more. And I hope the magic she found in fishing will cast its calming and happy spell on me. She would like that, I know she would. ●

Predators of the Coastal Plain

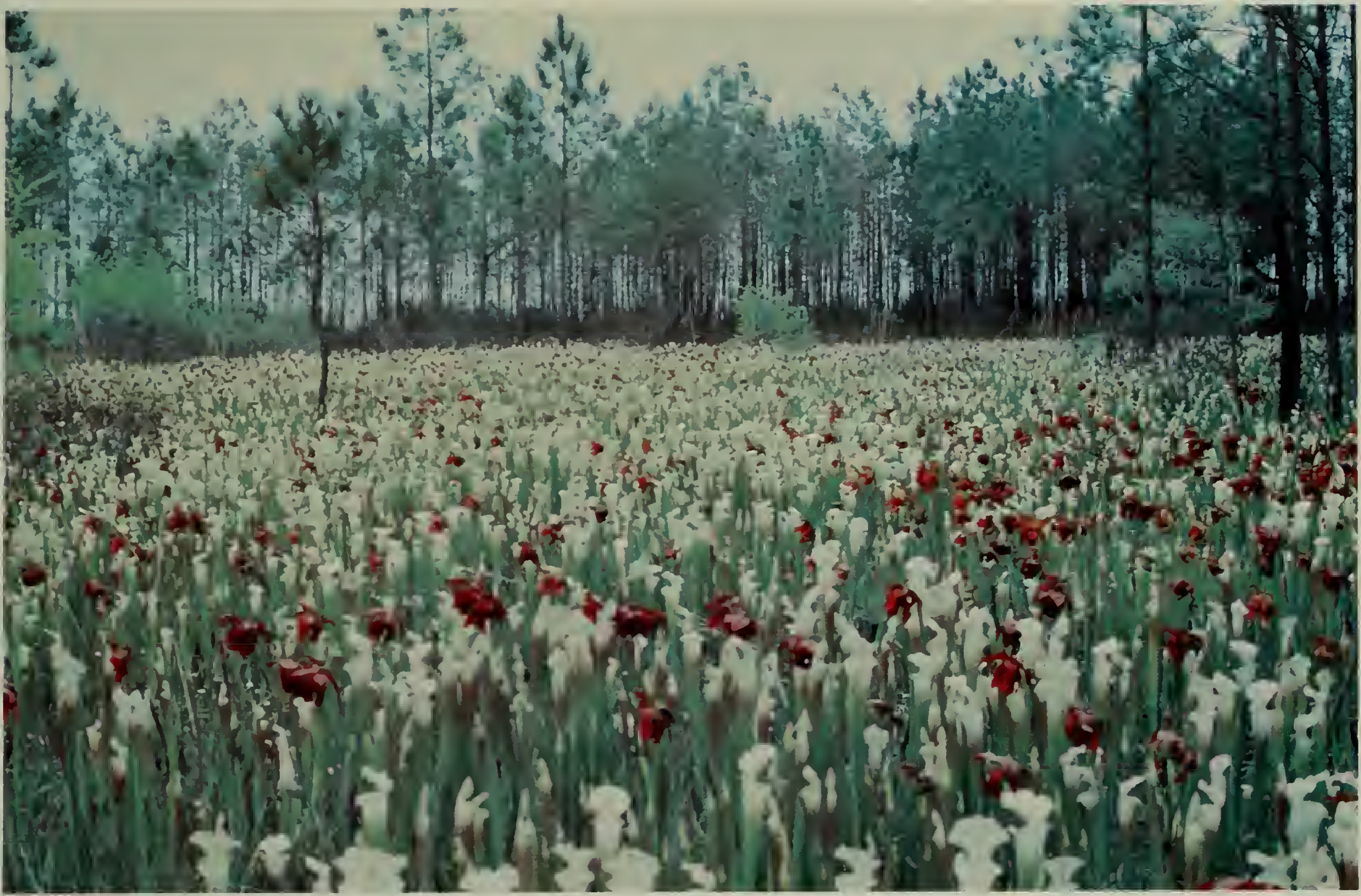
By Trip Lamb
Photos by the Author

I suppose I should confess falling victim to dime-store fiction, an amalgam of truth and fantasy that captures the best of us in those impressionable years. Jungle novels, where heroes were pitted against formidable foes of nature, received utmost priority. Of all the fictional adversaries, however, carnivorous plants were the ultimate nightmare. What a horrid fate to be nabbed by the very bush behind which you were hiding. More recently I was truly delighted to discover that such plants actually exist—even more so to learn that most of them restrict their diet to insects and the like.

Not only are these plants found in faraway places (as the more vivid imaginations rightfully dictate), but many species occur within our state. With four genera and over twenty species inhabiting the coastal plain plus other species existing in other parts of the state, Georgia is richly endowed with these extraordinary wildflowers. But why, you may ask, should plants, whose placid food-gaining processes via photosynthesis depict ultimate autonomy, resort to preying upon other organisms? To find the answer we must backtrack briefly and examine a portion of plant history.

Over millions of years, new species of plants arose to invade certain habitats previously unsuitable for plant life; such areas invariably lacked one or more of the basic requirements associated with proper plant growth. The carnivorous plants of North America chose lowland bogs and swamps where necessary minerals such as nitrogen were in very short supply. Occupants of acid soils, these plants trap and digest small prey organisms to supply substances otherwise absent in their characteristic habitat. Thus equipped with peculiar predator mechanisms, the carnivorous plants are among the most impressive products of botanical evolution.

At a glance the butterworts appear to be just another one of many innocuous wildflowers inhabiting pine savannas and bogs. Each spring their tall stems, bearing solitary flowers, arise from a clump of basal leaves. Nothing about the plant alludes to its carnivorous habits. Upon closer inspection, however, each leaf surface reveals hundreds of macroscopic glands, many of which exude a glue-like substance; others secrete digestive enzymes. With these inconspicuous attributes, the butterwort leaf functions as a piece of living flypaper. Should a tiny insect attempt to scurry across a leaf, it soon mires down, hopelessly adhering to the sticky surface. Soon the plant's digestive glands come into play. Caustic enzymes convert the insect proteins into more fundamental components. With digestion complete, the plant readily absorbs necessary



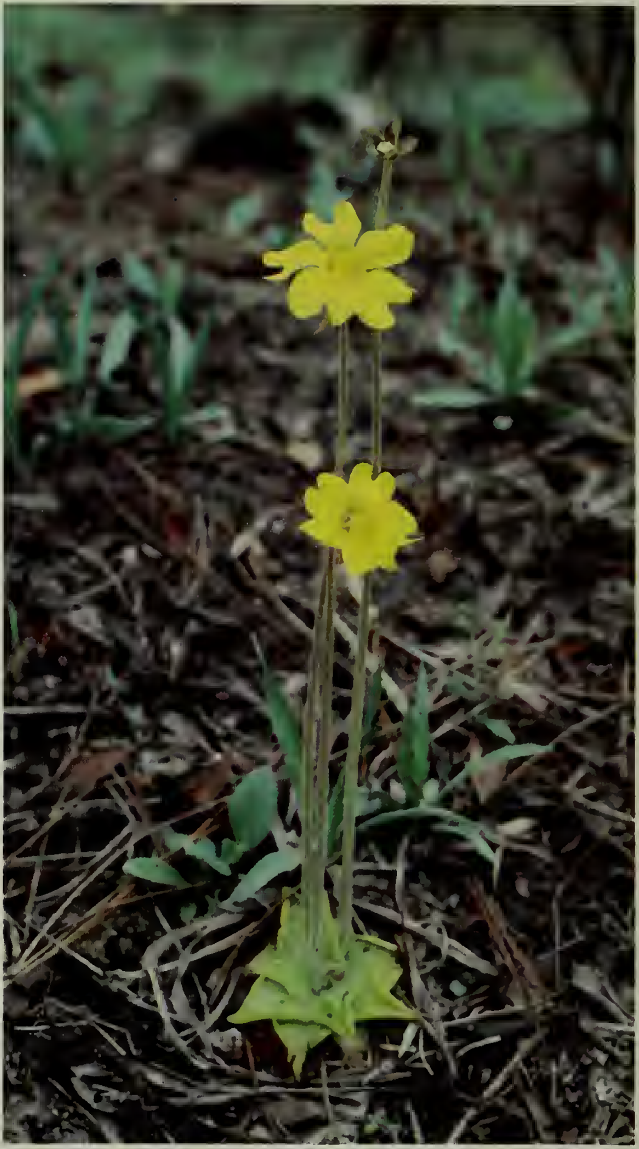
Large stands, like this one, of the pitcher plant Sarracenia leocoplylla *are becoming increasingly rare.*

minerals. These raw substances will be incorporated into plant proteins at a later date. All that remains of the unfortunate victim is a withered exoskeleton—a stark warning to future trespassers.

The sundews surely stole the butterworts' patent for snaring bugs, for their strategy is remarkably similar. The sundews, however, have employed some elaborate improvisations to make their traps more effective. Rather than minuscule glands, sundews bear large stalked ones resembling tentacles. Topped with a clear viscous fluid, each gland appears laden with dew, hence the plant's common name. Drawn to nectar secretions, insects light upon the glistening leaves. Smaller organisms are held fast by the leaves' adhesive surface. Slowly, adjacent tentacles descend upon the struggling prey to insure the plant's hold. A few days later, the quarries' resources depleted, the stalked glands assume their original position. Remarkably, sundews show a bit of discretion, for if a small rock or twig is placed on a leaf, the plant soon recognizes such objects as inedible and releases its hold. These enigmatic mechanisms aroused the curiosity of the eminent naturalist Charles Darwin. He spent years studying the sundews and their carnivorous associates. Darwin's findings were published in one of his less controversial works entitled *Insectivorous Plants.*

Despite their relative abundance, the diminutive bladderworts often go undetected in the wild. Many species lead an aquatic mode of life, favoring quiet ponds and swamps. During summer months, the delicate blossoms emerge from their watery abode, producing a spectacular display. On tranquil mornings the tiny flowers are difficult to distinguish from their flawless reflections. Beneath the water's surface lies the bulk of the plant. Rootless stems bifurcate into smaller branches, which terminate in countless specialized leaves, or "bladders". Only a tenth of an inch in diameter, these structures comprise the business portion of the bladderwort. Each is a miniature spring trap of complex design and proficient performance. The oval vessels are fluid-filled with a unique trap door on the distal end. Sensitive hair-like structures surrounding the door serve to trigger the trap. For potential prey items, inadvertent contact with the trigger hairs beckons disaster. Once tripped, the door suddenly swings open, followed by a vortex of water that sucks the prey inside. Instantly the door snaps back into its original position, securely sealing the chamber. For the hapless individual, escape is impossible; digestion inevitable. With the entire process over in a fleeting 1/240 of a second, there is little time for building suspense. A varied assortment of organisms are subject to

(Opposite page) Of elegant design and efficient performance, the leaves of the purple pitcher plant, Sarracenia purpurea, *are perfect pitfall traps. (This page, top photo) Allured by the sundew's tentacles, these tiny insects will soon serve as food for* Drosera filiformis. *(Lower left) The purple bladderwort,* Utricularua purpurea. *(Below) The red pitcher plant,* Sarracenia rubra, *is often found growing with its larger relative,* Sarracenia leucophylla.



A common occupant of moist, sandy soil, the yellow butterwort, Pinquicula lueta, *is frequently encountered in pine woods and savannas.*

predation. Protozoans, crustaceans, mosquito larvae, worms and even small tadpoles are ingested. Some authorities have suggested the use of bladderworts in mosquito control. The notion seems less absurd considering that a stand of the plants occupying 100 yards of shoreline is capable of netting over 1.4 million mosquito larvae.

Among the showiest components of our coastal bags, pitcher plants depict a bit of pretentious evolution. Both pitchers and flowers appear to be more of a surrealistic accomplishment than a natural one. In certain areas where habitat is optimum, pitcher plants form dense stands, sometimes covering several acres. In full bloom such bogs create an awesome display of gregarious splendor, rivaled perhaps only by the tulip fields of Holland.

Although the flowers are distinguishable mainly by color, the leaves or pitchers come in a vast array of shapes and sizes. Some are trumpet-shaped, others urn-shaped; some stand over three feet tall, while less conspicuous forms lie prostrate. Why all the variability? Each species specializes in capturing a certain group of insects; therefore pitcher design varies to accommodate the prey each plant prefers. This phenomenon, known as resource partitioning, enables many species to coexist by reducing competition.

The pitcher is a unique evolutionary innovation. With a digestive soup filling the base of the shaft, these tubular reservoirs are perfect pitfall traps. Enticed by a nectar source, an unsuspecting bug alights on the pitcher's rim. Once entering the pitcher, the insect soon finds itself in a precarious situation. Recurved bristles coerce descent. Waxy substances cling to the insect's wings and feet. As the tunnel narrows, frenzied attempts to escape serve to weaken the victim. Fatigued and bedraggled, the insect finally succumbs to the acrid liquor below. Prodigious numbers of insects contribute to the plants' lengthy repast over summer months. Having served their purpose, the weathered pitchers of most species die off in late autumn. Underground rhizomes will send forth new pitchers the following spring, starting the cycle all over again.

Any biology student with a conscience could not write about these remarkable wildflowers without inserting a brief plea for their welfare. Carnivorous plant habitat has been steadily declining over recent years. Though many species are still quite common, others are not faring so well. Stream channelization, farm pond construction, excessive fire control, not to mention commercial collection, have all contributed to the degradation of carnivorous plant habitat. Fortunately there has been a growing concern over the plight of these and other wildflowers throughout the state. Under the Wildflower Preservation Act of 1973, six species of pitcher plants have been designated as "protected species". Such environmental awakening is encouraging, not only for Georgia's native flora but for all of our state's natural heritage.

The next time you visit a portion of south Georgia, keep a close watch for these botanical carnivores along roadside ditches and savannas. Be careful though: they're apt to capture your interest as easily as they catch bugs in the bog. ●

Stalking the Backyard Bear

Sometimes you get the bears, sometimes the bears get you.

By Kent Kammermeyer
Wildlife Biologist

It all started back in April of 1977. I had just begun as a wildlife biologist with the Georgia Game and Fish Division when the wildlife nuisance complaints started rolling in from all angles. First it was deer eating gardens. Then came muskrat and beaver damage in farm ponds. And finally the ultimate — bears.

Bears, it seems, have a habit of getting into all sorts of trouble in the springtime — raiding bee hives, garbage cans, or camping areas, or maybe just loafing around in town on a Saturday night looking for action. David Carlock, the experienced bear research biologist in Gainesville, had warned me about the bear-catching business, but being a rookie biologist, of course, I had to learn for myself.

Our first big assignment came in a moment's notice (as they all do). We happened to be in Atlanta working at Georgia Tech on some sort of computer analysis. We snuck out of there to get some lunch (our first mistake). Our state band truck radio was blaring continuous conversation about a bear in Marietta. Our Atlanta office was looking for the nearest wildlife biologist with a dart gun. Well, David and I were both biologists and we did have a dart gun. So, forgetting the old army principle of never volunteering for anything, we found ourselves quickly on the way to the scene of the crime, discussing the pros and cons of volunteering (our second mistake). We arrived at a subdivision near Sprayberry School and the scene was disturbing. Three television camera crews were there from Channels 2, 5, and 11, neighborhood kids were running everywhere and police cruisers were constantly circling the block. When we came to a stop the newsmen assaulted our Game and Fish truck asking where the bear was. Since they had been there longer than we had, we thought that question was out of line. David whispered over to me to be prepared for a long, dull afternoon since real bears rarely show up at bear complaints. We loaded two doses of drug anyway just to look prepared. We had just finished all preparations when a voice shouted, "There he is!" Sure enough, loping across a vacant lot toward us was our bear, a real one. David grabbed the dart gun and won a foot race with the camera crews over to the bear, who also got in the race. Meanwhile, I frantically loaded another dart with drug. The shot went off from David's gun. I ran over to him with a fresh dart. He was just picking up his discharged dart. We opened it and could tell it had made a good clean hit, injecting all of the drug.

Joe Homilton

We held off camera crews for nearly 10 minutes, allowing the drug to take effect. Then the search began; I went one way and David

Aaron Pass

Bear researchers at work. David Carlock, above, investigates an active den tree containing a young sow and at least one cub. Kent Kammermeyer, below, prepares to tranquilize a trapped bear so it can be removed and examined.

David Carlock

the other. We met halfway between that small patch of woods and still had not found the bear. We began scouring the edge of a small pond, when David found him and called me over. The bear was lying in the mud with his nose partly under water and bubbles rising from his nostrils. Another inch or two and he would have drowned! We quickly lifted his head and checked his vital signs — they were ok. Meanwhile, the camera crews were tiptoeing through the mud and water and brush to get a closeup. After obliging the press, we lifted the 100-pound bear and carried him to our truck. One more picture and interview session, and we loaded the groggy, drugged bear in the truck and headed for Gainesville.

As usual, we got stuck in traffic around Canton and the drug began wearing off. The bear had sat up and was looking over the back of our tailgate contemplating escape. We stopped, ran back there and injected another syringe full of tranquilizer. All we had to do was get to Gainesville where a bear cage was waiting. We took all of our information from the bear — weight, measurements, age, sex and gave him a pair of ear tags for identification and a radio collar to track his movements. After releasing him in the remote mountains, the reality of the event hit us. We had captured a bear with a dart gun, nothing went wrong, and all of it in front of TV cameras. Old Marlin Perkins (of "Wild Kingdom" fame) himself could not have done any better.

Carlock and I talked about the amazing capture and came up with a list of items which make it virtually impossible to catch a bear the way we did. We call them the Principles of Bear Catching.

1. As mentioned previously, bears seldom show up at bear complaints. Even if it is a real bear, he is rarely seen.
2. A crowd of people, always at bear complaints, tend to scare the bear away.
3. Bears are more easily captured when chased up a tree. However, bears very seldom will cooperate and actually go up a tree.
4. We have to get within 30 yards range of the dart gun with a clear, unobstructed shot. Bears prefer thickets and will run the other way on sight of a human.

5. We have to hit the bear in the heavy muscle of the hindquarter to prevent injury and overdosing of drug.
6. We have to load the proper dosage of drug for the body weight of the bear.
7. The powder charge in the dart has to go off on impact.
8. And, finally, we have to find the drugged bear after he's shot. Sometimes, we can narrow it down to one or two acres of woods, if we're lucky.
9. For all of the above to work, we have to be extremely lucky. More often than not, one of these principles fails and that's the end of the bear capture. Murphy's Law, often applies to bear capture operations: Everything that can go wrong will go wrong.

In 1977, things slowed down after the Marietta bear. But by mid-1978, we were beginning to wonder if things would ever slow down again. Our first incident of that year, in May, was typical. David and I were sitting in the Health Clinic in Atlanta for our annual checkups. We should have remembered that every time we go to Atlanta something goes wrong. Our secretary called and told us that a bear had shown up in downtown Gainesville. Frantic calls were reporting bear sightings by motorists, homeowners, shoppers and police. Well, we couldn't do much good 60 miles away. We got to Gainesville as quickly as we could, gathered up dart guns and began bear hunting. There were at least six Game and Fish units at the scene when we arrived. They quickly said goodbye and deserted us. The police left, the animal control unit left, and even the newspaper reporters left. The only thing we could do was stay in the area and wait for sightings. We raced from one bear sighting to another all afternoon, always getting there a little too late. We did see the bear four or five times but never got close enough for a shot. After six hours of futile effort, we arrived at another complaint and ran into the woods with our dart guns, police following. David spotted the bear sitting in a small thicket looking confused and tired. We eased around looking for an opening through the tangled vines.

Leonard Lee Rue III

Through the scope of the dart gun, I picked out a small opening in the tangled brush and threaded a dart through to the bear's front shoulder for a solid hit. The bear ran a few yards and stopped within 10 yards of David. The police officers then came crashing through the woods with guns drawn. The bear made a beeline for the thickets, as fast as he could go. We lost our easy capture and knew it would take time to find him now. That thicket was one of the worst I've seen — honeysuckle, kudzu, privet, briars and all.

After 10 minutes of waiting, we spread out and started into the thicket. A squeaky little voice yelled out from the other side of the thicket, "Here he is!"

"What?" we replied.

"The bear, he's over here."

We crawled through the thicket as quickly as we could and found a group of young boys standing in the open woods and the bear leaning against a tree 20 yards away weaving his head back and forth. He had run about 300 yards through the thicket, had come out the other side and collapsed near the excited audience.

Now anyone who knows little boys knows they are always into something they're not supposed to be into — this time it was capturing bears. But we sure were glad they helped us find him. I often wonder what they told their mammas that night about the experience!

Anyway, the bear was already showing signs of recovering from the drug. We got him to the truck just in time to give him another injection as he was rolling around on the ground wrestling with two biologists. The gathering crowd took it lightly, though, asking each other if that really was a bear.

Well, we ended that episode with another trip to the mountains after tagging, weighing and measuring again.

By now the bears were really bent on giving us trouble. Three days later, I was on my way to check a complaint in a Forsyth County campground on Lake Lanier. I got there only 30 minutes after deputies had sighted the young trash can marauder. David Belcher, a biologist, was nearby on another complaint, and he came in to assist me. First inspection of the area revealed about 10 smelly garbage cans turned over in the campground. Two young boys approached us and nonchalantly stated that they followed the bear and got within about 10 yards of him. Then they offered, "We have a fish, you want to use it?"

"For what?" I said.

"You know, for bait to catch that bear."

"You've got to be kidding," I said, "That won't work."

David and I, along with a Forsyth County deputy walked into the woods with our dart guns. About 45 minutes later, we arrived back at the campgrounds, hot, tired and empty handed. "I'll take that fish now," I cautiously said to the boys. They brought us a 1½ lb. bass. We built a small fire, thoroughly burned the fish and hung it up on a tree limb near the campground. We sat on a picnic table thinking about the futility of the situation and fully believing we were in for an extra long bear hunt. Less than 10 minutes passed when we heard a scuffling in the leaves. We looked over in the woods and David and I looked back at each other simultaneously blurting "squirrel." We heard it again. We heard it a third time and saw a patch of scraggly black hair. "It's a bear," I said in a hoarse whisper. We slid off the table and got in position for a shot. We could see the bear now, slowly approaching the fish with his nose in the air. But he was actually too close for a shot — less than 15 yards away from us. I tried anyway and my high arching dart apparently went over his back. Unsure of a hit, I motioned for David to shoot; his dart hit the bear high and flipped over, spraying drug in all directions.

Well, we really had trouble now not really knowing if either dart had injected any drug. This wild bear was amazing, though. He took the excitement all in stride, walked over and sat down in a honeysuckle patch less than 10 yards from that smelly fish. We stood there in plain view, wondering what to do next. Common sense told us we had to wait. We stood there dead still for 10 minutes watching for the drug to take effect. No reaction. The bear was still sitting there, looking around wondering how to get that fish out of the tree! I raised my gun and shot again — this time it was a solid hit in the shoulder and the bear ran off. We were able to keep him in view and he keeled over after five minutes. We carried him to the truck, loaded him and headed

At left, a sub-adult bear is measured. This age class contributed most of the suburban wanderers. (Below left) This lip tattoo will identify this bear if it is ever re-trapped or killed. (Below) Still heavily under drug, this young bear displays its identifying ear tag which matches its tattoo.

for Gainesville. Amazing! We had gotten away with two mistakes and still came out looking like Marlin Perkins. This bear also went to the mountains where he probably came from in the first place. We were running out of wild places to put these mischievious rascals.

Less than a week later, we captured bears number three and four in the same night.

David Carlock used a trap to catch one that was raiding beehives in Franklin County. My catch was a bear at Big Canoe resort area which was getting into cabins. It seems two of them had teamed up to crawl through a window on the porch, climb down into the kitchen and grab a bunch of ripe bananas lying on the kitchen table. They did make a tour of the house before they left, eating sugar, coffee and other edibles, tipping over chairs and tearing up pillows. We knew we were after real bears when we got there because there were two distinct muddy bear tracks on the interior of the kitchen wall where they had climbed through the window. The homeowners were deciding whether to leave them as souvenirs or wash them off.

Anyway we did catch one of these bears in a trap (after two weeks of baiting). It was a diminutive 82 pound male yearling.

This pair of catches made four bears caught in a two week period in our own region alone, plus one captured further south in Cobb County. The ironic part about it was that we had been baiting and trapping bears for research purposes on a prime mountain location in the heart of bear country for nearly two months without catching a single animal.

There has been a definite pattern to these nuisance bear complaints this year and in previous years. We are almost exclusively dealing with young yearling male bears who have wandered far from their normal range in search of living quarters. These wandering yearlings are common since their mothers, after denning with the yearlings through their second winter, wake up in the spring ready to breed again. Bears breed every other year so the older (1+) cubs are forced to leave when mamma bear mates and begins preparation for a new litter to be born again the following winter. In the spring, then, it is apparent that neither the mother bear nor the adult male who seeks to breed her will tolerate cubs in the vicinity. This sends yearling cubs in search of new territory. Many males seem to go south and end up in trouble wherever there are enough people and cars and cities to get tangled up with. Weights of the yearlings we have captured this year range from 82 to 120 pounds — typical for this age animal. Ages are determined for certain by micro-

Keeping track of bears. This bear sports a radio collar which will allow researchers to check its location. (Above) Carlock and technician Al Crews try to locate a collared bear. By understanding their ranging habits, we can more intelligently manage bears and protect their habitat.

scopically examining a section of tooth and counting the growth rings which are similar to those that occur on a tree.

In spring of 1978 we were spoiled by success. Catching four bears in quick succession is a feat not to be taken lightly. Things usually manage to even out in the end though. Some of our later complaints were quite frustrating. I answered one in Hall County which was typical of the later complaints. About nine o'clock on a Friday night in June, I received a phone call that told the story of a 30 pound bear cub which had been chased up a tree by dogs near a house on Lake Lanier. For the entire 45 minutes it took me to get there, I was worrying about the whereabouts of mamma bear and wondering what she would do to me or anybody else who threatened her cub. After all, what self-respecting mamma would abandon such a small, helpless cub?

When I arrived at the scene, there were two deputies, three firemen and about a dozen local residents shuffling around nervously in a small patch of woods. I was met by a deputy who led me to the tree, a tall spindly pine. He shined his light up the trunk and said, "There he is!" I grabbed the light and heaved a sigh of relief at the same time. There, 20 feet up that skinny pine tree, was a small, thoroughly frightened groundhog! The 8-pound animal was clinging to the bark and glancing to the ground wondering what all the excitement was about. After I convinced all the bystanders that it really was a groundhog, arguments and apologies broke out all at once. Nobody would really admit they thought it was a bear — blaming it on everybody else. I found it to be quite amusing that out of all those people, deputies and firemen, that nobody could figure out the difference between a bear and a groundhog.

After that, Carlock and I investigated about 10 more bear complaints where we did not see a track or bear or groundhog or anything. We have started to selectively choose which complaints are worth visiting and only visit worthwhile complaints where damage or injury to bears is a potential. This bear capturing business is touchy at best! ●

CROP DAMAGE & DEER

Georgia's most popular big game animal is also an agricultural pest.

By Daniel K. Grahl, Jr.
Wildlife Biologist

Complaints about deer damage to gardens and agricultural crops have increased significantly over the past few years. This does not necessarily mean high deer populations since one or two deer are capable of doing more damage than most people care to tolerate. Damage caused by just a few hungry deer will prompt complaints from Farmer Smith whose 600 acres of soybeans are being destroyed, or John Doe whose one acre garden is being invaded.

Deer feed on many different species of plants and are especially fond of those grown under fertile conditions. Damage can be in many forms such as: nipping off the terminal buds of trees (called browsing) which stunts growth; knocking fruit off trees; trampling down plants as they travel through; and eating garden and field crops. In early fall, bucks can do considerable damage to small trees by rubbing them with their antlers. In Georgia, the major crops affected are soybeans, peanuts, watermelons, peach and apple orchards, and home gardens.

Since damage can take so many different forms and occurs over such widespread areas, it is difficult to recommend repellents or other control measures which work every time. If deer populations are high, there is no inexpensive or simple solution to the problem. In most cases, long-range planning and management of the herd are required. The following methods can be helpful to landowners suffering from deer damage.

Population Control

The most practical method of controlling deer damage to crops is to keep the herd in check. This can best be achieved through legal hunting during the regular deer hunting season. Many hours of enjoyable recreation can be provided for the hunter and if the landowner rents the hunting rights to his land, he can receive some extra money to help compensate for any loss due to damage. Hunting alone will not necessarily solve the problem. In many cases, large tracts of land are posted which means they receive little or no hunting at all. The "protected deer" will then move off this land to adjacent land and continue to cause damage. Allowing hunters to come on your land and take the surplus animals may not solve the problem entirely, but it can reduce the amount of damage occurring. It can be especially helpful if the hunters will cooperate and remove doe deer during those days set aside as legal either-sex days. The only effective way to reduce a deer herd through legal hunting is by removing the doe deer.

In May of 1976, the Game Management Section of the Game and Fish Division was authorized to issue permits for the purpose of controlling deer doing damage to agricultural crops. This authorization was for those crops which would be marketed. These permits allowed the landowner to shoot a specified number of deer and could even specify the number of bucks and does to be taken.

A recent study of crop damage by deer in the Southeast by biologists W. Gerald Moore and Robert H. Folk III of South Carolina's Division of Wildlife and Freshwater Fisheries showed that 12 of 15 southeastern states utilize a permit system for controlling deer damage. Although this method is used frequently, there are many disadvantages which must be considered. It requires many man-hours of time for each deer that is killed. It is often inefficient because other deer move into the area to take the place of those shot. Many times it generates bad feelings with the local sportsmen who feel they are being deprived of the opportunity to utilize the surplus deer for hunting. Therefore, the best method for reducing the deer herd and, in turn, reduce the damage caused by deer is allowing access by legal hunters to remove the surplus animals.

It is often necessary to keep nuisance deer away from crops and gardens although the herd has been reduced. This is generally achieved by using one or a combination of the following: (1) repellents, (2) frightening devices, and (3) fences.

Repellents

In the past, most of the repellents kept deer away because of their odor. Probably the most commonly used odor repellent in Georgia is one manufactured under the brand name Magic Circle Deer Repellent. This is virtually a pure concentration of bone tar oil (liquid produced by the process of dry distillation of bone which has a pungent odor). There are two methods of applying this repellent for protecting crops. One is most adapted to gardens and small fields. It requires the erection of stakes (fence posts will substitute), with burlap or other suitable material wrapped around the top of the stakes, spaced approximately 15 to 20 feet apart. The burlap is then soaked in the solution and usually requires another soaking in 10 to 14 days. Many landowners have used this repellent with little success. In most cases, the failure of this repellent to work has been due to the late application. To obtain better success requires that the repellent be applied **before** the deer start eating the crop. Once feeding has commenced, it is difficult to keep deer from continuing with an odor repellent.

The other method of application is to mix the repellent in a spray tank and spray a band six feet wide around the entire field. This is usually applied to other vegetation growing adjacent to the field. Experiments have been conducted with other odor repellents such as human hair (obtained from barber shops), insecticides and even lion dung. Some of these have been successful in keeping deer away from crops.

Experiments are presently being conducted on several taste repellents. Unfortunately, most of the taste repellents are limited to fruit trees. In one study that has just been completed by Game Management biologists, chemicals containing the compound Thiram were tested on apple and peach trees. The two chemicals used were Tat-Go and Arasan 42-S. Tat-Go is no longer available and Arasan 42-S is manufactured by Dupont in a limited amount. The results showed a very significant protective effect for the first three years.

Frightening Devices

Frightening devices which have been used and proved successful range from tying dogs up around fields to the sophisticated carbide guns. The general rule of thumb concerning frightening devices is to let your imagination be your guide. The best results have been obtained by using several different types and changing them every couple of weeks. This is necessary because after a short period of time, the deer realize they are in no danger and will start damaging crops again.

Some of the other methods tried include placing kerosene lanterns around the field on top of barrels, placing portable radios around the field with the volume turned up, and tying aluminum pie plates from overhanging tree limbs so that they beat against one another when the wind blows. As mentioned previously, let your imagination be your guide.

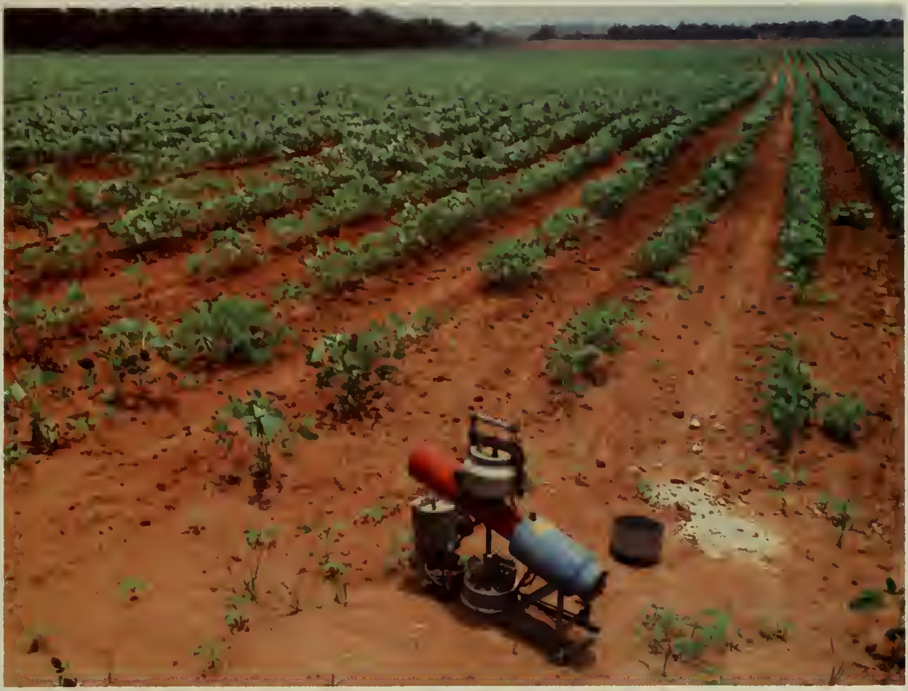
Fences

Fences can be the most effective means of controlling damage, but they can be expensive over a short period. However, if properly constructed they can last for up to 15 years, which reduces the cost significantly. Fencing is generally limited to one of two types: overhanging and electric.

The over-hanging fence can be constructed by using six-foot poultry netting with 2-inch mesh, having one edge fastened to the ground with stakes and extending upward at an angle of approximately 50 degrees. It is sloped away from the crop to be protected. As deer approach the fence, they walk under it along the edge and seem unable to jump over.

Electric fences have been successful in repelling deer from a 40-acre watermelon field. In other cases, a single strand proved ineffective. The most effective electric fence is one used in an experiment in South Carolina by biologist W. Gerald Moore. It is called a modified Vermont-type electric fence. This fence is an outrigger type, consisting of six smooth, heavy gauge, galvanized wires. Three of the wires are charged and the other three serve as grounds. The fence is five feet in height with an outrigger two and one-half feet from ground level and situated two feet

Ken Grahl



Bill Bryant

This carbide "cannon" fires explosive blasts activated by a self-timer. It works until the animals find that it is harmless.

Although soybean damage is the best known of deer depredations, other crops, orchards and home gardens are also affected by deer damage. This watermelon has been ruined by one kick and nibble.

outside the main portion of the fence. Each of the live wires is charged by a separate fence charger. This permits higher voltage and a stronger shock. A fence like this was constructed around one-half of a 4.5 acre soybean field in an area having an estimated deer population of one deer per 10 to 15 acres. The unfenced portion of the field was totally destroyed 13 days after planting; however, the fenced portion received no deer damage at all. Construction of a modified Vermont-type fence around a rectangularly shaped 50-acre field with a length twice that of its width was projected to be $42.58 per acre. The cost without posts would be $26.30 per acre. As the size of the field increases, the cost per acre decreases. If the initial cost of constructing this fence were prorated over the entire serviceable time (up to 15 years), the cost probably would not be prohibitive and might even be economical considering the increased profit margin obtained from stopping the loss due to deer damage.

Summary

The most efficient means of controlling deer damage to crops is through allowing legal hunters access to remove surplus deer. This is best accomplished by concentrating on removing doe deer on legal either-sex days. Permits are authorized for severe crop damage problems but often require high man hours for each deer taken. By renting the hunting rights to hunters, landowners can receive additional income which, in most cases, will offset any loss due to deer damage. Repellents can be used effectively if application is made before deer begin damaging crops. Frightening devices can be effective if several different types are used. By changing every couple of weeks, these different types seem to be more effective. Fencing is the most efficient, but initial cost of construction may seem to be prohibitive. However, if these initial costs are prorated over a serviceable period (at least 15 years) the fences are no longer prohibitive and may even be economical.

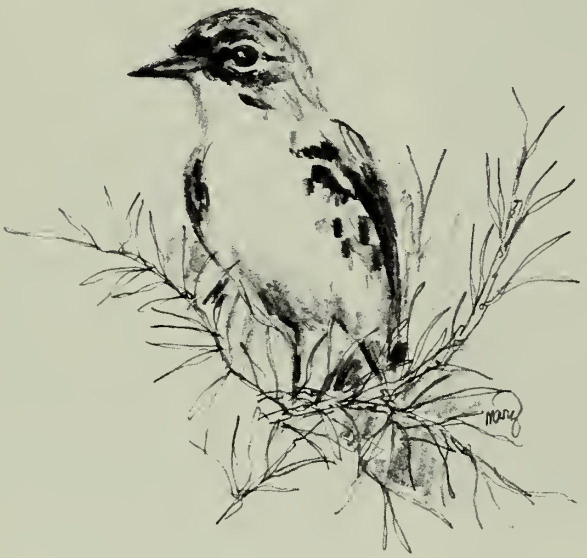
By contacting your local Game Management Office of the Game and Fish Division, technical assistance in controlling deer crop damage can be obtained. Wildlife biologists and technicians are available to explain the techniques found to be most effective in the different areas of the state. Remember that for repellents or frightening devices to be most effective requires that they be applied before the damage starts occurring. ●

focus:

Georgia's Protected Species

Kirtland's Warbler

By Mary Anne Neville-Young
Biologist, Game & Fish Division



In the forests of northern Michigan, the endangered Kirtland's warbler is slowly returning from the road to extinction. This apparent comeback is due largely to a belated understanding of the unique needs of this tiny songbird. Appropriately called "Michigan's Bird of Fire," the Kirtland's warbler cannot survive unless its breeding grounds are burned. The case of the Kirtland's warbler, like that of so many other endangered species, reflects the vulnerability of a creature which is highly specialized.

The scientific name for the Kirtland's warbler is *Dendroica kirtlandii;* it belongs to the warbler family Parulidae. Members of this taxonomic group are small, colorful, insectivorous songbirds. Fifty-four species of warbler occur in North America.

Like many warblers the Kirtland's exhibits sexual dimorphism: that is, the male and female birds differ in appearance. Apparently nature has devised it so that the least conspicuous bird, the female, stays with the nest. The showy male is characterized by yellow underparts, with black streakings along the breast and flank, a bluish-grey back also with some streaking, white undertail feathers, a black face mask, and a black bill. The female lacks the face mask and generally appears more uniform in color. Immature birds and fall warblers (birds which have molted their breeding plumage) appear mostly grey in color.

The song of the warbler is wren-like in character. It consists of loud, low-pitched bubbling notes. In true warbler tradition, the Kirtland's is very active and constantly flits about, rarely staying in one spot. It also continuously bobs its tail, a trait which helps distinguish it from other warblers in the field.

Kirtland's warblers are ground nesters using fine grasses to construct their nests built near the base of

The Kirtland's warbler's endangered status is primarily a result of specialized habitat requirements. These birds, with breeding ground in north central Michigan, require young jack pine stands, 80 acres or larger in size. To maintain pine ecosystems like this, fire is necessary because the cones of mature jack pines will not open to release their seeds except under intense heat. (Illustrations by Mary Anne Neville-Young.)

young jack pine trees. The lower limbs of the tree conceal the nest, which may contain four to five very pale yellow or pink eggs with brown blotches. The eggs incubate in about two weeks. The male bird feeds the female during the incubation period.

The breeding range of the bird is limited to small areas of upper Michigan. Wintering areas are in the Bahama Islands. Consequently, the bird's migration route occasionally includes Georgia's Atlantic coast. Because the Kirtland's warbler is a federally protected species which is transient in our state, it also receives statutory protection in Georgia even though the last documented sighting was early in the century.

Why is the survival of the Kirtland's warbler uncertain? The most significant factor involves the breeding part of the bird's life history. In 1903 the exact breeding ground for the species was discovered in north central Michigan. It was determined that the birds require young jack pines in stands of 80 acres or more for nesting. To add to this already specialized requirement, the bird seems to prefer only jack pine stands growing on "grayling sand," a particular type of porous soil. These jack pine communities represent an intermediate stage in ecological succession. To maintain this pine ecosystem, fire is necessary because the cones of mature jack pines will not open to release their seeds except under intense heat. Since fires have been generally prevented rather than encouraged in areas otherwise suitable for jack pine stands, the reduction of breeding habitat has contributed heavily to the decline of the warbler.

In addition, the pine forests in the Bahamas, which constitute the bird's wintering sites, have been heavily logged. Thus the warbler quietly lost habitat in the most vital portions of its range: the place where it breeds and the place to which it is biologically programmed to migrate for the winter.

Another problem which faces the Kirtland's warblers which do nest successfully is the brown-headed cowbird. This member of the blackbird family is the only brood parasite in North America. After throwing out the eggs which actually belong in the nest, the cowbird lays its own eggs in their place. Cowbirds regularly parasitize several warbler species, the endangered Kirtland's included. In this way, Kirtland's warblers become unknowing foster parents to one or more young cowbirds, drastically decreasing their own reproductive successes.

To aid in the recovery of the warbler, state and federal agencies are removing cowbirds from Kirtland's warbler breeding habitats. In addition, controlled burning is being carried out in potential nesting areas to ensure ample stands of young jack pine. To promote the maintenance of proper habitat and protection on the bird's wintering grounds, the U. S. Fish and Wildlife Service, along with the Minnesota Department of Natural Resources, is working in cooperation with the Bahamian government.

For the last few years, the U.S. Forest Service has conducted a breeding census for the Kirtland's warbler in Huron National Forest in Michigan. The census technique involves a counting of singing males. In 1976, reports indicated 200 breeding pairs. In 1977 the census showed 218 pairs, a small but welcomed increase. The 1978 census indicated 193 singing males. This decline from the previous year may be a result of habitat loss within the survey area. However, an interesting sidenote to the recent census was the observance of 2 singing males in Wisconsin and 2 singing males in Quebec. Although these birds were presumably unmated, their appearance in these areas may represent a pioneering effort in that portion of their historic range.

No numerical estimates exist for the Kirtland's warbler in Georgia since it is such a rare transient during migration. Perhaps, however, when the number of Kirtland's warblers increase, the birds will again be spotted in Georgia. Someday, perhaps, during spring or fall migration on the coast, a fortunate observer will sort through a flock of warblers with binoculars and discover a Kirtland's among them. This will be a time to look forward to.

focus:

Georgia's Protected Species

Lady's Slippers

By David Ettman
Photo by Leonard E. Foote

Two of Georgia's most striking native wildflowers, which are becoming increasingly scarce due to habitat destruction and indiscriminate collecting, are now protected under Georgia law.

They are the pink and yellow lady's slippers (*Cypripedium acaule* and C. *calceolus* var. *pubescens*), members of the orchid family, the most advanced in the plant kingdom. Other colloquial or common names for these species include moccasin flower and stemless lady's slipper for the pink, and golden slipper or nervine root for the yellow.

These alluring plants differ from their relatives in several ways. The most obvious difference is the presence of the swollen lip petal which resembles a little shoe or slipper, hence the common name, lady's slipper (*calceolus* actually means little shoe in Latin). The lady's slippers are thought to be a primitive group in the orchid family, growing as they do in soil rather than attached to trees like many orchids indigenous to the rain forests of Central and South America.

North Georgia provides one of the southernmost habitats for the lady's slippers, which occur as far north as Canada. In addition, a variety of yellow lady's slippers can be found in Europe and Asia. Dense colonies of the pink lady's slipper exist in scattered north Georgia locations while the yellow lady's slipper is less common.

The pink lady's slipper is typically found in pine woods which have a thick layer of needles covering the forest floor, while the yellow prefers rich, moist deciduous woods. In Georgia, the flowers normally open in early spring, however at high elevations they may bloom as late as July.

The two species are quite distinct in appearance. The pink lady's slipper has two downy basal leaves which lie flat on the ground, hence the origin of the colloquial name, stemless lady's slipper. The yellow lady's slipper has three to five leaves alternately arranged on the stem. The flowers of both species have two inconspicuous petals, and a third which is showy and modified into a labellum or shoe. The color of this conspicuous petal is the greatest distinction between the two species. The pink species varies from pale to deep pink and is often laced with red veins, while the other species is a rich lemon color with varying amounts of deep wine red spots on the upper portion of the petal. These vibrant colors help attract insects which are necessary for cross pollination in the lady's slippers.

Charles Darwin was one of the first to examine

Pink Lady's Slipper (Cypripedium acaule)

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Late in the summer or early fall, the capsule matures and breaks open, scattering the tiny seeds into the wind.

These seeds are different from those of most other flowering plants because they are naked embryos. In other words, the seeds have no stored sugars to provide for the growth of the new plant. For germination to result, the seeds need to come in contact with a specific soil fungus which provides the nutrients which the seeds lack. Needless to say, only a very small percentage of these seeds ever germinate, and even fewer reach maturity.

It takes five to seven years for lady's slippers to mature and flower. During this time the roots of the plants enjoy a symbiotic relationship with soil fungi called mycorrhizae. Without them, the plants cannot grow.

The low success rate of lady's slippers reaching maturity and the other intricacies of their life history may be natural causes for their rarity. However, man's activities have contributed greatly to the decline of these interesting and beautiful plants.

One major factor in the scarsity of lady's slippers is their collection by commercial and amateur plant collectors. Collecting has caused the species to all but disappear in places where they were once plentiful. And the sad part about it is that the plants rarely survive transplanting. In addition, the root of the yellow lady's slipper has been collected for many years for its reported medicinal value as a nerve sedative. Other major factors which are contributing to the decline of the lady's slippers include clear cutting, reservoir construction, and other developments associated with urbanization.

The pressures of collection and habitat destruction need to be reduced if future generations are to admire the pink and yellow lady's slippers in their natural environments, rather than solely in botanical gardens. ●

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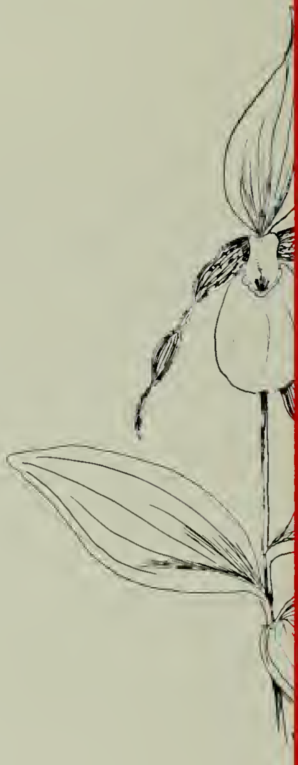

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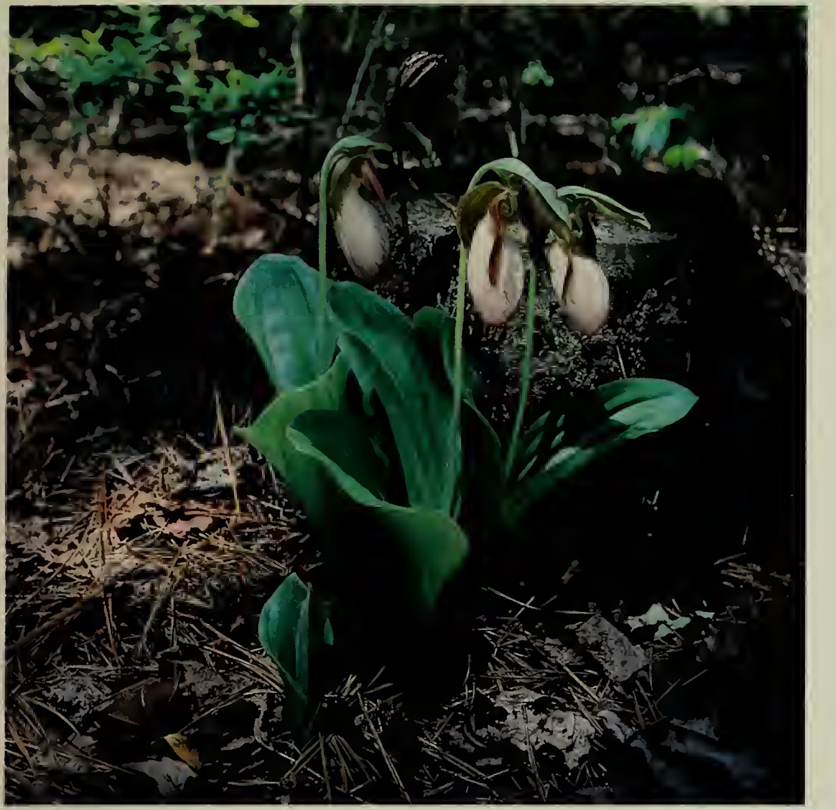

Pink Lady's Slipper (Cypripedium acaule)

this pollination process. Darwin found that bees were attracted to the lady's slippers by a nectar-like substance secreted by the tiny hairs that line the inside of the lip petal. He also noted that once a bee entered the shoe or lip petal, it exited through a different opening, and always with pollen sticking to some part of its body. Upon closer examination, Darwin discovered that it was impossible for a bee to leave the flower the way it had entered because the edges of the lip petal were infolded preventing exit, in addition to the fact that the petal's inner walls were slippery. So how was the bee leaving?

It turned out that the only way for a bee to make its exit was to crawl out through two small openings at the other end of the flower. In so doing, the bee will inevitably brush up against a structure which bears the sticky pollen. The bee then goes on to the next lady's slipper carrying pollen obtained from the last flower. As the bee enters the next lady's slipper and goes out, pollen from the previous flower may brush off onto the stigma, thereby pollinating that flower.

Occasionally, one will find a lady's slipper flower that either has large holes in it or a large dead bee. A bee that is too large for the openings in the flower must tear its way out or be trapped forever.

Once the flower or lip petal is pollinated, a capsule develops which contains thousands of minute seeds. Late in the summer or early fall, the capsule matures and breaks open, scattering the tiny seeds into the wind.

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One major factor in the scarsity of lady's slippers is their collection by commercial and amateur plant collectors. Collecting has caused the species to all but disappear in places where they were once plentiful. And the sad part about it is that the plants rarely survive transplanting. In addition, the root of the yellow lady's slipper has been collected for many years for its reported medicinal value as a nerve sedative. Other major factors which are contributing to the decline of the lady's slippers include clear cutting, reservoir construction, and other developments associated with urbanization.

The pressures of collection and habitat destruction need to be reduced if future generations are to admire the pink and yellow lady's slippers in their natural environments, rather than solely in botanical gardens. ●

The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land organism. Only those who know most about it can appreciate how little is known about it. The last word in ignorance is the man who says of an animal or plant: 'What good is it?' If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.

—Aldo Leopold

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Outdoor Commentary

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End of the Line

It is said that all good things must end, and we are about to prove the truth of that axiom. This is it—the final edition of *Outdoors in Georgia.* With this issue we will "suspend publication indefinitely," as they say in the magazine business.

Why? Well, a lot of complex answers could be recited in response to that, but the reason is really very simple. Money, the lack thereof, was, and is, the problem. Faced with the imperative to reduce state spending on one hand and the necessity of continuing legally required and publicly demanded programs on the other, the Department had to cut some things out. *Outdoors in Georgia* was one of those things.

Rather than dwell on that, we would like to take this last opportunity to talk with you about this final edition. We have tried to bring you a landmark final edition which will not only wrap up your publication in style but will also tell you about some of the important functions and objectives that will be of continuing interest to the Department and to you. This is a major section called the State of Natural Resources.

For those of you who keep back copies for reference we have compiled a final index to *OIG* 1972-1979. We have also included a gallery of what we, the editors, consider to be our best photographs.

In a more normal vein, we have a selection of stories on places to go and things to see in Georgia. There is also a particularly interesting article on Georgia non-places called "The State of Dade and Other Stories," which we think you will like.

In closing, I can speak for the entire staff of the magazine in saying that it has been a pleasure producing the magazine and doing business with you. I am reminded in this instance of a long dead kinsman of mine who had amassed a considerable estate and was reported to be rather tight-fisted. My great-uncle, Moses by name, advised his rich brother-in-law that, being childless, he should spend his fortune on himself and his wife rather than let others enjoy the fruits of his life's labor. Came the reply, "I say, . . . I say, Mose. If they enjoy the spending of it as much as I've enjoyed the making of it, I say, they'll have a hell of a good time."

Aaron J. Pass

The State of our Natural Resources

Special Section by Lucy Justus

This year is the tenth anniversary of Public Law 91-190. Few people recognize it by that designation and most laymen, referring to it by name, do so inaccurately.

The National Environmental Policy (not "protection") Act of 1969 received congressional approval January 1, 1970. It was the dawn of a new year and a new era.

Two years later, the Georgia Department of Natural Resources was formed.

In any summary of the status of Georgia's natural resources, these landmarks are a dividing line, a point of separation between a naive and sometimes irresponsible past and a somewhat saner future.

One important thing the reorganization of state government did for Georgia's natural resources was to consolidate the agencies responsible for managing those resources.

"In 1972, the government effort in natural resources was very fragmented," DNR Commissioner Joe D. Tanner said. "There were 36 or 37 agencies dealing with some aspect of natural resources. Putting all these agencies together in one department, I think, has been a tremendous step forward."

When the department was created, the conditions NEPA and the air and water quality laws would eventually help to change still existed. Georgia's water and air were badly polluted. Its marshlands, beaches, dunes and flood plains were threatened by rampaging development. Strip mining left expanses of land barren and eroding. Roads and dams were built and streams channelized without assessment of ecological or archaeological damage. Persistent pesticides, some capable of gradual lethal accumulation in fatty tissues of the body, were used without restriction, threatening human health and bringing some species of wildlife to the edge of extinction.

It was an era of dramatic confrontations and changing values. The Georgia Department of Natural Resources was involved in both.

Joe Tanner, who has been DNR commissioner since the department was formed, has many memories of the early days and issues which, like the Civil War, frequently pitted friend against friend and brother against brother. Quick forceful action was often necessary, action of the type the Commissioner once took at 2 o'clock in the morning when he halted an illegal dredging operation on the Georgia coast by threatening to confiscate the federal equipment involved.

How have things changed?

The National Environmental Policy Act—which, among other things, required Environmental Impact Statements and public participation in the planning process—and other state and federal laws have helped enormously, the commissioner says. But we still lack the basic understanding necessary to solve many of our problems. We now recognize various problems, he says, but we do not always put them into a perspective broad enough to see their relationship to each other.

"I feel there is still an important need for public education and public understanding in the area of natural resources," he observed. "I think, for example, that it is absolutely essential for the hunter and the fisherman to understand that the quality of the land and the quality of the water are probably more important to him as a hunter or a fisherman than anything else.

"Too many hunters are more concerned about what the deer regulations are, when they can hunt deer and under what conditions they can hunt them than they are about the loss of hunting habitat. The same thing is true of fishermen. Many fishermen don't want to hear the Department of Natural Resources talk about water quality. The only thing they want to know is: are there any fish in the lake or stream. Fishing, of course, is absolutely dependent on water quality.

"We deal with many types of people: conservation groups, groups whose primary interest is hunting or fishing, and some 'anti' groups whose only goal in life is to see that there is not a hazardous waste site located anywhere in Georgia or that there are no nuclear generation facilities in the state. The truth is that all these things interrelate in the big, broad natural resources picture. I think we are going to have to continue our efforts to make absolutely certain that all the various groups understand how they relate not only to their own individual interests but how those interests relate to the big, broad picture. I see that as being a major problem.

"In the long term, the projections are that growth in the state of Georgia will be very rapid both from an economic standpoint and a population standpoint," the commissioner continued. "As the state continues to grow, we will have many pressures put on our land and water resources. Where are we going to put the hazardous wastes we generate? Where will we find recreational opportunities? Will there be sufficient land for that? I see that as being one of the great challenges of the Department of Natural Resources.

"In my opinion, water is more important in this state than energy. We don't produce much in the way of fossil fuels. We have to import them. On the other hand, most of the major river systems in Georgia rise in the state and our groundwater resources for the most part—not entirely, but for the most part—come from within our own boundaries. Just a few years ago, people considered this resource inexhaustible, but now we know there are serious water problems in many areas of the state. I think that managing our water resources in the future is going to be one of our tremendous challenges.

"I think, for example, that it is absolutely essential for the hunter and the fisherman to understand that the quality of the land and the quality of the water are probably more important to him as a hunter or a fisherman than anything else."

"I think there is also an enormous challenge in managing our coastal resources. Georgia has a very unique and very beautiful coastline with a great deal of potential. We wouldn't really have to make many mistakes to mess up one of God's greatest creations. How we manage the coast of Georgia—when I say 'we', I mean not only state government but local government, federal government and private enterprise—will be one of the biggest challenges this department will be involved in."

The mission of the Department of Natural Resources is to manage, guide and promote the wise use of the state's natural, historical and recreational resources for the benefit of Georgia's present and future generations. In that goal, there are many challenges. In the following pages, the commissioner and DNR's four division directors discuss the problems currently faced by each of the divisions and how the public can help to fulfill the responsibilities of each generation as a trustee of the environment for for succeeding generations. ●

Leonard Ledbetter

Environmental Protection

"...our immediate problem on the horizon is the issue of hazardous waste material."

It sounds like a nightmare or far-fetched fiction. Nevertheless, it is possible for some insidious substance—which can kill people or seriously impair their health—to infiltrate the environment without anyone's realizing the substance is harmful.

In the past, several things have become widespread before their adverse human effects were discovered. Are there materials now pervading the environment which may eventually prove to be dangerous?

Leonard Ledbetter, director of Georgia's Environmental Protection Division, has to ask that question and he isn't particularly happy about the answer.

J. Leonard Ledbetter is by no means a sensationalist who manufactures scary images to attract attention. A quiet, intense man with a southern drawl and a granitic approach to the protection of Georgia's natural resources, he is a straightforward realist who is not given to fanciful ideas.

It is possible, he says, that we may discover that certain materials currently being released into the environment are harmful. In Georgia, he is responsible for reducing that potential as much as possible and he considers the problem the biggest challenge his division faces.

Lately, the work of the Environmental Protection Division has changed considerably. Originally, EPD was primarily a regulatory agency whose efforts were directed toward pollution control.

"Because of recent federal and state legislation, like the Clean Air Act and the laws pertaining to water resources, solid waste management, safe dams and other things, we are now becoming environmental resource management oriented," Leonard Ledbetter said. "That has been brought about partly by the progress that has been made in correcting pollution problems of the past. The progress by industry in particular puts Georgia in the position today of being one of the very few states which can say all its significant industries have modern air and water pollution control devices installed and in operation.

"We cannot say that every day of the year all of our industries are in compliance with all federal and state requirements. On any given day a particular industry may have operational problems. There are operational problems and equipment failures, but the facilities are installed and in operation.

"The really major water pollution problem in Georgia today is local governments. A number of factors come into play when you talk about that. During the sixties and the early seventies, the federal funds Congress authorized were not appropriated and made available to local governments. Therefore, they waited on the grants Congress had authorized and in many cases never funded. Sometimes when they were funded, the executive branch impounded the money. That delayed the clean-up program by local governments throughout the United States. It is not unique in Georgia. Although we have made substantial progress, we haven't solved the problem. We still have at least a billion dollars in needs that have not been met in Georgia on the part of local governments in modernizing their water pollution control facilities.

"The president's position is that we should have a Federal Construction Grant program of $4.5 billion per year for a 10-year period with those funds coming to the states to pay 75 percent of the cost of each town's or each county's water pollution control clean-up. In 1978, Georgia received $78 million. This year we are receiving $80 million and next year we expect to receive somewhere between $70 and $75 million, so we do receive substantial sums of federal funds that enable us to do more than $100 million each year with local governments in Georgia in correcting our water pollution problems."

In addition to the progress made by government and industry, several state and federal laws have contributed to EPD's becoming more of a resource manager than a regulatory agency.

Under Georgia's Groundwater Use Act, anyone who wants to take more than 100,000 gallons of water per day from the aquifer system must obtain a permit from EPD. Before issuing the permit, EPD is required to determine whether the supply will support the demand. In some cases, the division can require a company or industry to drill several wells instead of one, thus reducing the impact on the resource.

The Surface Water Allocation Act, another management-related law, requires a permit to take more than 100,000 gallons per day from a river. Among other things, the permit is a form of assurance. No other industry or municipality can come in upstream and take away the water for some other use.

"The exemption of agricultural uses from these two water management laws is a major concern at the present, and many persons involved in the agricultural community now want to be covered by these laws," Ledbeter said.

"One of the things we are doing in our Geological Survey program is to define better the extent of the water resources of the state and the availability of those resources," he continued. "The average citizen thinks in terms of Georgia's having unlimited water resources, but we are out of water in Georgia—today, in 1979—in certain areas of the state for many different uses. Working with Industry and Trade, we have had industries to say, 'We want to locate in a particular county or near a certain town and we need X-million gallons of water per day.' Taking the information from the Geological Survey program and knowing the history of the area, we know it's not there, for two reasons.

"First, during the dry summer and fall months, there is only a certain amount of water in the river or stream in that area, and we already have demands on it from existing communities or existing industries. In the northern half of the state we can obtain only limited quantities of groundwater.

"Second, our technology for treating wastewater is such that you don't remove 100 percent of the pollutants. There is a residual amount of pollution that must be assimilated in the river by Mother Nature, so you have already utilized some of the capacity of that river.

"When you look at the new industry that says, 'We will need this much water and we will have this much wastewater with these pollutants,' then you have to say, 'Well, we are out of water in that area and, therefore, you can't locate there because the resource won't support you.'

"We are still fortunate in that we have not had a single case where we had to say to the industry, 'You cannot locate in Georgia because we don't have the resources to support you.' We can point to other areas of the state, but sometimes that is much less attractive because other things like transportation, potential employees and the availability of raw materials are not desirable.

"In the Atlanta metropolitan area, water resources are already the controlling factor on growth and growth potential as far as certain water-using industry is concerned. We are out of water for that type of industry and as we get closer to the year 2000, the pressure on the available supply will become greater. At some time in the future we will be in the situation where the local water system will have to say, 'We cannot tie on any more customers. We don't have the water to do it.' That is a problem that has been documented. It's not someone speculating. We have some rather hard facts to support it. The practice of water conservation is going to be more and more one of the tools we will have to work with, and the priorities assigned to the use of water may very well become a factor. Certain uses may have to be identified as of lower priority just to supply drinking water needs."

Bob Busby

EPD manages Georgia's air resources as well as its water resources.

"Under the Clean Air Act," Ledbetter observed, "Congress mandated specific increments that you cannot exceed for certain pollutants such as sulfur dioxide and particulate matter which are the two major air pollutants in this country. Both are related very much to the combustion of fuel—coal and fuel oil. When that increment is used up, additional growth in that particular area is not allowed. You have to move out into other areas. In managing the air resources, when we issue a permit to an industry, we are in fact providing that industry with a slice of the pie as far as that resource is concerned.

"I've had discussions with the U. S. Environmental Protection Agency in Washington and in the Atlanta regional office and they agree that our immediate problem on the horizon is the issue of hazardous waste materials. That is a very broad area and the Congress has enacted a law saying that we've got to do a better job of that in this country.

"If you asked the man on the street what a hazardous waste is, he wouldn't have the foggiest notion," Ledbetter continued. "When I talk about hazardous waste being a problem of the future, without some explanation of what we are talking about, the average person thinks maybe of something very poisonous and toxic. He doesn't think about many, many things he is using in his home. In the production of those things, there may be hazardous or toxic wastes generated.

"EPA in 1978 came out with their first rules identifying hazardous wastes. That's quite a challenge in itself because hazardous waste covers many types of material. In many cases in this country, we have been allowing it to go into the environment unregulated. Some hazardous wastes have gone in with garbage and been buried in sanitary landfills or thrown out on some small town garbage dumps over the last several years. People have filled it into ravines and in some cases chemical companies have just stored the material on their property for years and years. Now suddenly it's leaching out into the environment. In some areas of the United States, it's getting into the groundwater or nearby streams.

"We don't know of any significant problems of this type in Georgia. Georgia is not a heavy industrial state especially as far as chemicals are concerned. On the other hand, we have sprinkled throughout the state, industries like the textile industry, the pulp and paper industry and the metal plating industry. These types of operations may have some wastes that are defined now as hazardous or toxic wastes.

"Any of the heavy metals, such as lead, zinc, copper, chromium, etc., in certain concentrations, are very toxic to aquatic life, to fish and to man. Our safe drinking water standards have limitations for inorganic chemicals and the heavy metals. But in addition to them, we have many, many organic chemicals as a result of the ability of our chemical industry to produce the synthetic compounds that benefit our society.

"We have ignored—or, up until recently, not even identified—the fact that there were some adverse impacts that could result as these materials entered the environment either through the sewers of the community or through sanitary landfills.

"One example would be the polychlorinated biphenyl—PCB. We had our own problem with that here in Georgia, in Rome. Even today, we still recommend that the people in Rome not eat the fish from the Coosa River because of the concentration of PCB in the fish tissue.

"That's the type of thing I see in the future as being a continuing challenge or problem to us in this country and in Georgia. Things we do not identify in 1979 as being of any environmental or public health significance or concern may become one as we learn more about it. That's true not only of materials that can be put on the land but into the water or emitted into the air.

"I see that as the big challenge: how we in this country can manage environmental resources so that we minimize that, stay ahead of the problem and not allow any more of those things to happen than possible.

"What we are concerned about first and foremost is the pathway to man. The pathway to man, of course, is through the food he eats, the water he drinks and the air he breathes. We are concerned about the impacts on the environment because some of these impacts will eventually get into the food chain which comes back to man, fish being a case in point. The fish may be feeding on something that is taking up a particular pollutant and concentrating it. Then the fish, by eating that, concentrate it, build it up in their tissue and then man eats the fish and he begins to accumulate it. So the pathway to man is our first concern. The key in many cases is to prevent these materials from ever entering the environment. If they never enter the environment, it won't be possible for them to get into the pathway to man.

Bob Busby

EPD attempts to monitor industrial usage of water by issuing permits. Availability of water resources is one key factor in locating industries in the state.

"One approach, of course, is to require extensive testing to be made on any new product or compound before it is put on the market. Congress has enacted legislation that requires industry to test new materials. However, I think it has to be improved upon and the program has to be handled much more diligently and effectively than it's being done now.

"The other course would be that once you go to the utilization of a certain product—if there is any question mark at all about that product—then you should exercise extreme caution and care so it's not allowed to just enter the environment like we allowed PCB to do. PCB was allowed to enter the environment from numerous sources for many, many years because no one was really concerned over it. When we did finally identify it as a problem, we had it widely dispersed throughout the environment."

On Governor Busbee's recommendation, the 1979 General Assembly enacted the Georgia Hazardous Waste Management Act. The principal purpose is to assure that any hazardous waste disposed of in Georgia is handled in a manner which minimizes the impact on the environment and protects public health. The act is consistent with the federal Resource Conservation and Recovery Act which will implement a procedure to track hazardous waste from the source to any treatment process and final disposition. The Georgia act requires that companies or parties involved in the disposal of hazardous waste in Georgia establish financial responsibility.

"And as we go more and more to nuclear power plants and other peacetime uses of nuclear compounds, we will have more and more radioactive wastes," Ledbetter said. "Nuclear materials have very long lives. Even half-lives run into years, even hundreds of years sometimes. We in this country just have not addressed the subject of nuclear waste properly. We haven't put the effort and expertise into that area that should have been put into it. There is no feasible—at least no economically feasible—technology today to properly dispose of radioactive waste. So what we are doing is just storing it in depositories around the country. We are not really recycling it or reclaiming it or disposing of it in any permanent fashion.

"The Savannah River Plant, which is over in South Carolina but right on our border, has quite a bit of this material just stored there. The facility near Barnwell, S. C. was originally designed to do some recycling, but they haven't been able to complete that plant and get the required federal permits so they, too, now are just storing the material."

He points out that, although Georgia has never had a major problem with nuclear wastes, storage containers have been known to rupture and their contents seep out into the environment. "Nuclear waste," he adds, "is going to continue to be a problem until this country comes up with a better technological solution to doing something with it.

"Another related problem is the whole issue of transporting nuclear materials. Last year there was a truck accident in northwest Georgia and early this year there was one up in Tennessee. We were very fortunate in both cases. The containers did not rupture so the radioactive material did not spread out into the environment, but a real major concern we have right now is the movement of this material on our highways, and the fact that you have the potential for a major accident. It could happen in a very highly populated area —like somewhere on I-75 or I-285. It has the potential for some very drastic adverse effects."

The 1979 General Assembly enacted legislation authorizing the Department of Transportation to regulate the movement of hazardous materials on public roads of the state.

Recent train derailments, like this one near Kennesaw in September 1977, have emphasized the possibility of hazardous waste spillage in Georgia. EPD investigated the Kennesaw accident because of the possibility of a chemical spill.

Bob Busby

Up until now, Ledbetter points out, the United States has had abundant natural resources but those resources are dwindling because of enormous demands upon them. And in many cases, the quality and quantity of resources such as water and minerals are unknown. "There is a need for better evaluation and clarification of the extent of our resources," he said. "Where are they in Georgia? In what quantities? This is less a problem than a challenge the state needs to do a better job with.

"Of course, as we get that information, we then will have the problem of trying to assess the environmental consequences of developing those natural resources, and there will always be some."

There is no panacea, but public understanding and support can help to solve many problems.

"I'd say the greatest need of the Georgia environmental protection program is a good understanding by most Georgians of the importance of their environment and the role they can play in trying to make the state a better place to live and work," Leonard Ledbetter said. "You are not going to get the needed legislation and the needed resources to carry out the job that has to be accomplished unless there is support of the people to do that job." ●

Robert Reimold

Coastal Resources

"... success is on the way for the Georgia coast."

Jim Couch

Georgia's coast, one of the most beautiful and productive sections of the state, is an area of conflicting interests.

Its marshlands, the source of the state's shellfish industry, are highly desirable to developers and contain minerals extremely profitable to miners.

Its fragile beaches and dunes, appealing as homesites and resort areas, if left undisturbed, protect the mainland from hurricanes and other major storms.

The coastal counties with scattered populations and low per capita income need a broader economic base.

And before the water and air quality laws became effective, the coast had some major pollution problems.

No wonder Georgia's golden coast has been a source of ecological concern.

Although the Department of Natural Resources has always had a coastal program, it did not receive division status until last year.

Dr. Robert Reimold, director of the Coastal Resources Division, says the coastal part of the state is in better shape than it has been for some time. Laws regulating water quality and use have helped as has legislation protecting marshlands and other sensitive areas. "With the ability Leonard Ledbetter (EPD) has to manage quality and our permitting system, I think we have a pretty good handle on managing the coastal area," Dr. Reimold said.

Changes in public attitudes have also made a difference. At one time, people seeking a permit to build in sensitive areas came in with completed structural plans, hoping to solve potential problems through negotiation. "Now they come in and ask for advice before they jump off the deep end with an architect," Dr. Reimold said. "The majority come in and do the negotiating before they apply for a permit."

Nevertheless, on the coast, as elsewhere, some of the old attitudes persist. These, Dr. Reimold says, are his biggest problem. "Georgia has always been 'all for everyone,' " he observed. Resources were plentiful and people more or less helped themselves as they pleased. Vestiges of that tradition are still evident. People today do not always understand they cannot do some of the things their fathers and grandfathers did. "Since we have more people, we have to be more restrictive to assure that something will be left for our children and grandchildren," Dr. Reimold said. "The problem is to educate the public on how to manage the resource better."

The wise use of Georgia's coastal resources will soon become even more important than it has been in the past. Dr. Reimold points out that, nationally, 50 percent of the population lives within 50 miles of a coast. The state figures are quite different. In Georgia only about 10 percent lives within 100 miles of the coast. By the year 2000, about 75 percent of the national population is expected to live within 50 miles of the Great Lakes and the two oceans. If Georgia follows the national trend, its coastal population will increase by 25 percent within the next 21 years.

"That means success is on the way for the Georgia coast," Dr. Reimold said. "It also means we have to have our homework done by the best minds we have available. We need people like Gene Odum to tell us how to develop in the best possible way." Dr. Reimold foresees more intensive development of such places as Jekyll and St. Simons. Fortunately, he says, there will remain places like Ossabaw and Sapelo, which will remain undeveloped, making Georgia's coast much more attractive and useful than the highly developed shorelines of many states.

The Coastal Division is putting considerable effort into its educational program while increasing its own understanding. Sapelo Island is an important part of the program and regularly scheduled tours provide children and adults with information about the area's resources and management. When school groups and adult organizations tour the island, Dr. Reimold and his staff try to plan some further contact. A DNR staffer tries to visit the group before or after the trip, or both, answering questions or providing additional information as requested. Dr. Reimold is pleased by the increasing frequency with which area hotels call to arrange tours for their guests.

The division cooperated with the city of Brunswick, Glynn County, the Brunswick-Golden Isles Chamber of Commerce, the U. S. 17 Merchants Association and the Coastal Highway District of Georgia on the Coastal Information Exhibit Center which opened October 6. The center, which includes aquaria and exhibits dealing with natural resources, gives visitors an introduction to the coast, its resources, activities and places of interest.

As a further educational opportunity, the division maintains the Anderson Library at its office in Brunswick.. The library, a well-stocked and growing collection of books, journals, reports, reprints, staff publications, maps, charts and movie films, is open to the public.

The need for education and changes of attitude are not limited to the public. DNR is increasing its own knowledge and changing some of its ideas. As one example, the department maintains three research vessels on the coast. In the past, Dr. Reimold said, people believed a sizeable fleet of research boats to be a tremendous asset. "Now, the department sees a time when the best way to get information is to go out on commercial fishing boats," he added, observing that there are two major advantages: the job gets done with much less expense and both the fishermen and DNR benefit from the exchange of thoughts and ideas.

Since the seafood industry is a vital factor to coastal economy, one of the division's most important jobs is the management of the fisheries resource. The harvest of shellfish and shad, the state's most important commercial finfish, has fluctuated in recent years.

The division recently began a new program to collect data on commercial and sport landings of shad. The landings will be recorded by sex, weight, unit price and the relative effort associated with the catch. The information will be used to develop a management program aimed at better and more consistent catches.

"The numbers of shrimp go up and down," Dr. Reimold observed. "We don't try to breed more shrimp. That would be like putting a drop of water in the ocean. We set up nursery zones. I tell people they are like nurseries in hospitals. You have to keep them clean. You can't have a lot of germs in there. We don't let people fish in the nursery zones and EPD sees to the water quality. If you make the habitat right and keep down the rate of 'crime in the streets' you have done the best job you can do."

Dr. Reimold says information now being gathered on shrimp, crabs, oysters, clams and finfish will help in developing management plans and predictive models for many species. In the future, he added, there may well be a demand for species which have not been used in the past, and the division is accumulating data on these species as well.

DNR Commissioner Joe Tanner agrees. "I think the big challenge in the commercial seafood industry is to diversify so our fishermen don't just depend on shrimping," he said. "There are other seafood resources in addition to shrimp. I think we have a tremendous potential to build up our oyster industry back to what it used to be in Georgia."

Marshes are necessary for the production of shellfish and many finfish, and they serve other purposes in the natural scheme of the coast. While Georgia now has a marshland protection law, there are still many requests for development and uses which would disrupt the natural functions of the marsh. The coastal division is responsible for enforcing the marshlands law, protecting beaches, dunes and offshore bars, and monitoring the activities on the Outer Continental Shelf where petroleum exploration is now underway.

Dr. Reimold does not see any important problems in the exploratory process. It will bring relatively few people to the coast and, initially at least, they will not be there very long. Should petroleum be discovered, he says, the potential would be considerably greater. There is always the possibility of an oil spill which could adversely affect fish populations along the coast. However, Dr. Reimold contends that most people overemphasize possible adverse effects without considering the benefits. And there are direct benefits to fishermen, he says. Production platforms make excellent fish habitat and fine landmarks for offshore fishermen.

Of offshore petroleum exploration and production, Commissioner Tanner observes, "Georgia is fortunate in that its greatest potential for offshore oil resides well outside our coastal boundaries. If they are successful in finding oil or gas and if there is an accident of any kind, we will have a very good chance of not having any serious impact on the marshes and beaches of Georgia's coastline, simply because the accident will have occurred 50-60 miles offshore or further. It is not like having an oil well within the tidal influence of the coast of Georgia which could be impacted within 24 hours. Of course, there is still the potential for accidents in transporting the oil or gas. And, if there is production, there will be some onshore impacts: Where do you run the pipelines if you bring it ashore that way? How do you handle the barges, etc.?

"While Georgia now has a marshland protection law, there are still many requests for development and uses which would disrupt the natural functions of the marsh."

"I don't think there is a great deal of potential in Georgia for an oil refinery simply because our ports are too shallow and too few," the commissioner added. "I suspect if they find oil, it will be pumped ashore and refined somewhere else. And a pipeline is the safest thing as far as oil is concerned."

One of the division's primary goals currently is federal acceptance of the state's Coastal Zone Management Plan. Among other things, having an approved plan will give the state a stronger voice in federal projects on the coast.

One federal project with considerable environmental implications is the Kings Bay submarine base. Dr. Reimold says that if Trident subs are to be based there, some 50 million cubic yards of material will have to be dredged out of the basin and disposed of. "One million cubic yards covers one square mile one foot deep," Dr. Reimold said. "That, of course, is something we are concerned about."

Disposal of dredged spoil has often been a source of contention on the Georgia coast.

Development of certain sensitive areas has been another, and those areas recently received a measure of legal protection.

During the 1979 session, the General Assembly enacted a law which restricts construction and other disruptive activities on beaches, in the dynamic dune field and in other areas such as those without stable dunes. A permit is required for any activity which would alter these areas, and permits will not be issued for projects which would adversely affect them.

The new law will, of course, help to preserve the natural beauty of the coast, but more importantly, it will assure that the mainland is not left open to the full force of hurricanes and other major storms. The protected areas diminish the impact of such storms.

"One of the things we are concerned about is the major developments along the coast," Commissioner Tanner observed. "King's Bay is one of them — 2,000 job opportunities by July of 1979, in a county that has a population of about 12,000. Of course, this being a nuclear submarine base, if it ends up being a base for the Trident submarine, the development there will be so much more tremendous than anyone could ever imagine. We are concerned about the dredging and filling there. Except for the dredging, it is basically a very clean development. There should not be any significant problems in water pollution or air pollution, and it shouldn't detract in any significant manner from the Cumberland National Seashore.

"The buildup at Ft. Stewart is another thing that has a great impact on the coast.

"There will be a great deal of pressure from people wanting to move to the coast, wanting to build where they can see the beach and the ocean—really wanting to build where they probably ought not to build. And somewhere down the line it's going to cost us regardless, because you are going to have a hurricane or you are going to have a 100-year flood or a 1,000-year flood. It will be very devastating. It is not a matter of whether that will occur or not. It is simply a matter of when. It will certainly occur and when it does, anytime a coastline is built up, it is going to cause some problems. On the other hand, we are fortunate to have some of the barrier islands that are basically undeveloped and they will serve a major role in absorbing energy from any storms that might hit the Georgia coast.

"Of course that is one of the reasons for barrier islands and one of the reasons for marshes in that they absorb a great deal of the punch out of storms."

Last year, the state acquired Ossabaw Island, a beautiful and important resource eight miles from Savannah. The island, dedicated as a heritage preserve, will be used exclusively for education, research and other activities which will not damage its natural integrity. Obviously, problems still exist on the coast as they exist elsewhere. But its most important assets now have some protection.

Dr. Reimold predicts that, as fuel becomes scarcer and prices rise higher and higher, more Georgians than ever before will spend their leisure time within the state. Many of them will go to the coast, which is now a better place than it might have been. ●

Leon Kirkland

Game & Fish

"I think that in order to carry out an effective program, we are going to have to acquire the land."

Some of the early days of Georgia's Game and Fish program were inauspicious. They were marked by a notable lack of money, a scarcity of professional personnel and an overabundance of political pressure.

As the program matured, good things happened to it. One of the best of these was Jack Crockford, who joined the staff as a young biologist in 1947 and retired last year as division director. Everybody who knows anything about hunting knows that two of Jack's many accomplishments were the restoration of Georgia's deer herd and the development of the dart gun which revolutionized the capture of wild animals.

Perhaps less well known outside professional circles is Jack's role in changing Georgia's environmental attitudes and preserving its natural resources. Always a professional and always a gentleman, he had no use for pork-barrel politics or governmental programs which adversely affected forest, field or stream. And he was no more lenient toward private enterprises which produced similar harmful effects. Although soft-spoken and even tempered, Jack Crockford was an awesome opponent of such projects and a major force in the fight for environmental integrity.

When current division director Leon Kirkland counts his blessings, he lists among them the conservation organizations which have developed in the state in recent years. "They fight a lot of our battles for us," he said. "Before, we had to do it all ourselves." Kirkland, who has been with Game and Fish for 21 years, is no stranger to environmental conflicts. He knows well the value of public support and whereof he speaks when he says, "These groups are a tremendous asset."

Bob Busby

But problems and pressures will always exist. In his years with the department, Leon Kirkland has seen development and urban sprawl consume enormous amounts of wildlife habitat. "Urbanization probably affects hunting more than fishing," he said. "Fishing is affected to some degree but not to the same extent. A lot of areas that were once available for hunting now are cut up into one-acre, two-acre or five-acre lots. And a high percentage of the urban population has not been exposed to a rural environment."

This, he feels, is unfortunate. Urban dwellers, he reasons, tend to see the "pretty" side of nature, the cute little animals which, according to movies, television programs and comic books, have human voices, mannerisms and emotions. Rural citizens have an opportunity to see nature from a broader perspective which includes the harshness of starvation, disease and predation.

"I think the anti-hunting sentiment has developed in urban areas because of people's lack of knowledge and understanding of what takes place in nature," he said. "The urban population will continue to increase and, with it, the anti-hunting sentiment. That is going to create a challenge for us to enlighten people as to what happens in the natural environment."

Kirkland was pleased by the defeat of the anti-trapping legislation introduced in the 1979 General Assembly. "It was encouraging to me to see that we haven't progressed to the point where we can't rationalize the use of a renewable resource if the resource is properly managed," he said. "On an issue like trapping, you may be talking about steel traps, but what you are really dealing with is a principle that applies to all hunting and fishing activities—the harvest of a renewable resource. To me the real issue is whether you can continue to harvest that resource as long as you don't damage the population. An adequately harvested population is a much healthier population than one which is not."

Kirkland predicts an increase in opposition not only to hunting but also to fishing. "There is some of that now, but very little," he said. "I think it is going to be a little more difficult to attribute human characteristics to fish than to animals."

The division's biggest problem, he says, is a shortage of state-owned

Bob Busby

Bob Busby

wildlife habitat. The number of hunters and fishermen has increased dramatically in recent years. At the same time, there has been greater development pressure on available lands and more and more private property is being leased to hunting clubs.

"I think that in order to carry out an effective program, we are going to have to acquire the land," Kirkland said. "We are now thinking in terms of a million acres the department should own. Of course, there is always opposition to public ownership of land because it takes the property out of the tax base."

The lands Game and Fish would most like to own are flood plains, which are not really suitable for agriculture or timber production and which should not be developed. "These areas are the most productive of all wildlife habitat," Kirkland pointed out. "Of course, protecting flood plain areas benefits the stream as well as the wildlife. Flood plains have tremendous benefits as far as water quality is concerned. They help to cleanse streams. And acquiring those areas precludes development, which shouldn't occur in flood plains anyway."

The state now leases must of the land it manages as wildlife habitat, but however cooperative the owner may be, wildlife is not the top priority on that land. First priority is usually agriculture or timber production. And, while the landowner does benefit from the arrangement, the state does not pay for the right to manage private land. Hunting clubs, however, do pay for the exclusive right to hunt on private property. Therefore, more and more land is being closed to public hunting.

"I think we will reach a point one day where if you don't own property or lease it, you will be confined to hunting on lands that are owned by the department or the National Forests," Kirkland said. "This is one reason I think we are going to have to acquire land ourselves. Wildlife habitat is going to decrease. That's just a plain fact of life. As the population increases, more and more land is going to have to be made available for homes and the production of food and services. That is something we are going to have to learn to live with. Of course, by owning land we can make it more productive to offset some of that loss."

Future hunters will have to be satisfied with fewer animals per person as well as fewer lands. "The same is true of fishing," Kirkland said. "We have been blessed with a lot of big impoundments, but I don't expect to see a lot more built. As the number of fishermen increase, that will mean a decrease in the amount per fisherman."

Trends in hunting and fishing have changed over the years, and as they change in the future some of them may become reminiscent of past eras.

"Twenty years ago, most people really went fishing to catch a mess of fish and they fished for the panfish species," Kirkland recalled. "Thev went for the recreation and the fish, but few went just for the recreation, and only a small percentage were bass fishermen. Now people aren't dependent on catching fish. They can go to the market and buy them. More people go for the recreation, and fishing has become a more competitive sport than it used to be. The majority of the fishermen probably prefer to fish for bass. I think the glamorization of bass has had to do with that and fishermen are better off today than they used to be. They are more mobile and they can afford the big bass boats with all the electronic gear."

As petroleum prices skyrocket and habitat-per-person plunges, people may again fish closer to home and perhaps even rediscover the fun of fishing for panfish.

"You have the same situation in hunting," Kirkland observed. "People used to hunt small game in a more or less localized area. They didn't travel all that much. Now they are much more concerned with the glamorous species — the deer, the turkey and the bear. This year we are going to recommend to the Board a bear season on some of the management areas where our data indicate the population is high enough to take a certain percentage without damage to the population.

"We also plan to place more emphasis on small game. In the past, small game has been fairly plentiful but we have concentrated on the big game. We will continue to concentrate on it, but I think—in terms of man-days of recreation that can be provided — small game has much more potential. We can support only a certain amount of deer hunting but we can provide an almost unlimited amount of squirrel hunting and rabbit hunting. I am not saying we have as many deer hunters as we can have, but we are almost to that point in terms of what the resource can stand. In small game we are nowhere near that potential. We will try to develop more interest in small game animals, to help bring back the attractiveness of small game.

"Another thing we are going to be dealing with is the management of non-game species. When I started with the department, there was no such thing as the management of non-game species. A lot of people enjoy going out and seeing birds, reptiles and small animals even if they don't take them. There will be an increased emphasis on the management of these animals on our management areas."

Kirkland says his division's biggest need is money for land acquisition and personnel. "With more hunters going into the woods and fishermen into the field, if we are going to enforce the law, we are going to have to have the people to do it," he said. "In the last five years, the number of hunters has increased 30 percent. The number of wildlife rangers in the field has increased zero percent. With the increasing numbers of hunters and fishermen, there is no way we can adequately enforce the law without more people. That is also true of our fisheries and wildlife management personnel. With a clientele that demands more and more, we will have to carry out more management practices to make the resource produce more." ●

Henry Struble

Parks, Recreation & Historic Sites

"...we are somewhat behind in the current demand in acreage. In fact, we are approximately 80,000 acres short."

Georgia's network of state parks began 154 years ago with a 10-acre tract at Indian Springs.

In 1825, when the Creeks deeded the land to the state, the tract was dedicated to recreation and, although it was operated by private interests for the first 100 years of its life as state property, it was Georgia's first park. "To the best of our knowledge, Indian Springs is one of the oldest parks in the United States," said Henry Struble, director of the Division of Parks, Recreation and Historic Sites.

It was 101 years before Georgia acquired Vogel, its second state park, a 248-acre gift from Fred and August Vogel in 1926.

For awhile both Vogel and Indian Springs were known as state forest parks and were administered by the Forestry and Geological Commission. Under the Reorganization Bill of 1931, both were officially designated as state parks.

During the 1930s, Georgia acquired five other state parks: A. H. Stephens, F. D. Roosevelt, Fort Mountain, Little Ocmulgee and Chehaw, which was transferred to the city of Albany in 1975. "From that point, our system has grown considerably," Hank Struble observed.

Georgia now has 43 active state parks, totaling 45,146.73 acres. And, with more than 13 million visitor occasions annually, Georgia's parks have a higher visitation rate than Yellowstone and the Grand Canyon combined.

The division also administers 12 active historic sites, totaling 435.44 acres and serving approximately 284,000 people each year. The sites depict all periods of Georgia history and include prehistoric Indian mounds, military fortification and furnished historical structures.

"In our Recreation Services Section, we have a Funding Unit which handles all the Land and Water Conservation funds allocated to the state," Hank Struble said. "The money is then reallocated to cities and counties and to the state for the purchase of land and the development of recreational facilities. This is a matching program, and it is quite sizeable. The section also administers recreation assistant grants, Youth Conservation Corps grants and Special Olympics grants.

"Recreation Services has people available to talk with cities and counties about their recreation programs, their funding and how to get a recreation department started within a city, county, hospital or institution.

"One of the biggest challenges we face is being able to acquire sufficient lands for parks to meet the future demands for outdoor recreation," he continued. "Large blocks of land are hard to come by, and they are going to be harder to get because of the trend of subdividing and cutting up large tracts and selling them for homesites or industrial sites.

"I think we have to buy the land now while it is available in large tracts and set it aside even if we can't develop it. Of course, another aspect of this issue is that not just any and every piece of land is suitable for a state park. We have to have an outstanding resource on which to establish a state park."

Actually, Georgia does not have quite enough park land to meet the present recreation demand.

"We developed the Parks and Historic Systems Plan," Director Struble said. "In it, we took a look at where we are today as far as lands are concerned. We found that we are somewhat behind the current demand in acreage. In fact, we are approximately 80,000 acres short. We base this on a figure of 25 acres per 1,000 population. If we could acquire 80,000 acres by 1985, we would be more or less even."

He cites other figures which indicate that Georgia is spending less money for land acquisition and new construction each year than some other states in the region. The figures, compiled by the Southeastern Park Directors Association, cover a four-year period and include 13 states. During the four-year period, the southeastern states spent an average of $4.1 million per year for land acquisition and an average of $4,036,000 for new construction. Georgia's average for the same period was $1.1 million per year for land acquisition and $1.3 million for new construction.

"It looks like the other states are moving out real fast on getting monies to acquire land and build additional facilities," Mr. Struble said. "We need to see if we can't do something here in Georgia to put a little more money in our land acquisition program and the construction of new facilities. We have been especially appreciative of the support Governor Busbee has given to our needs for major repair and maintenance funds."

On February 3, 1979, Hank Struble celebrated his twentieth anniversary with the state parks system. In that time, he has seen a great many changes. One of the most important of these is the alteration in land use which has made it more difficult to obtain suitable land for parks. Another is a change in the public's appreciation or sensitivity which has made it somewhat easier to preserve historic sites than it once was.

"I think people have become more and more aware that these sites are fast being removed from the landscape and that certain sites should be preserved," he said. "As a result, many local historical societies and special interest groups have been formed. They work very diligently to make sure their particular city or county—and, of course, we in the state—identify and record the fact that these are significant sites which should be set aside for future appreciation for the cultural and heritage values.

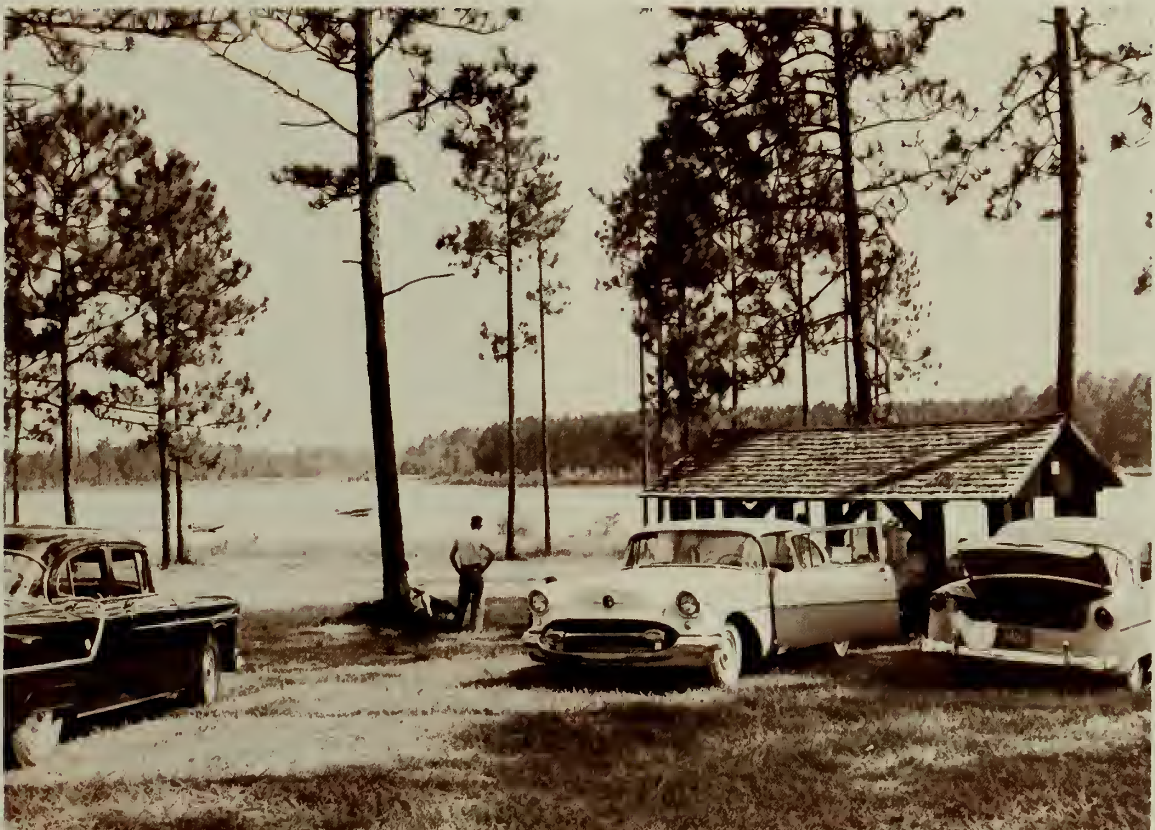
"More attention is being directed to historic sites than there has been in the past. I think there has been a general groundswell of interest by various people in preserving their heritage through acquiring, preserving and operating significant historical sites.

"Our feeling in DNR is that we should only operate sites which are of either state or regional significance and that the cities, counties and the private sector should attempt to acquire and operate sites of local significance. Through our historic preservation grants, we are assisting people, organizations and local governments in acquiring and restoring these sites."

Another major change has been in trends or tastes in recreation. A few years ago people were much more interested in the highly competitive team activities than they are now. Today's recreation tends to be more personal. "There is a wider range of choices for recreation," Hank Struble said. "And I think that wide range of interest will increase. The growth of activities not associated with big equipment or gymnasiums will come to the forefront. We see growth in unstructured activities coming forward. There is a feeling among the recreation people that emphasis is now being placed on getting away from competition. It is moving more toward activities which provide personal satisfaction."

In recent years, the increased interest in the environment has resulted in different types of recreation programming.

When the state acquired Panola Mountain in 1971, it



was designated as a conservation park and its use limited to education and appreciation of the resource.

"Five years ago, I set up interpretive programming in our division to interpret the natural and cultural resources we manage for the people who visit our parks and historic sites," Hank Struble said. "At our historic sites, we try to make people aware of what occurred there and why the site is significant. At our parks, we use the natural resources as a base for interpretation. We plan nature hikes and schedule campfires. Visitors can choose from a wide variety of activities whether visiting a park for a day or a week.

"We have all the system divided into four administrative regions with a regional naturalist assigned to each region. Primarily, the naturalist's job is to work with the superintendent, to assist in programming and to be personally involved in planning and conducting a variety of programs for each of the sites. During the winter months, we have a lot of special activities with the naturalist working with the superintendent and resource people to conduct special programs using, of course, the resource as the focal point.

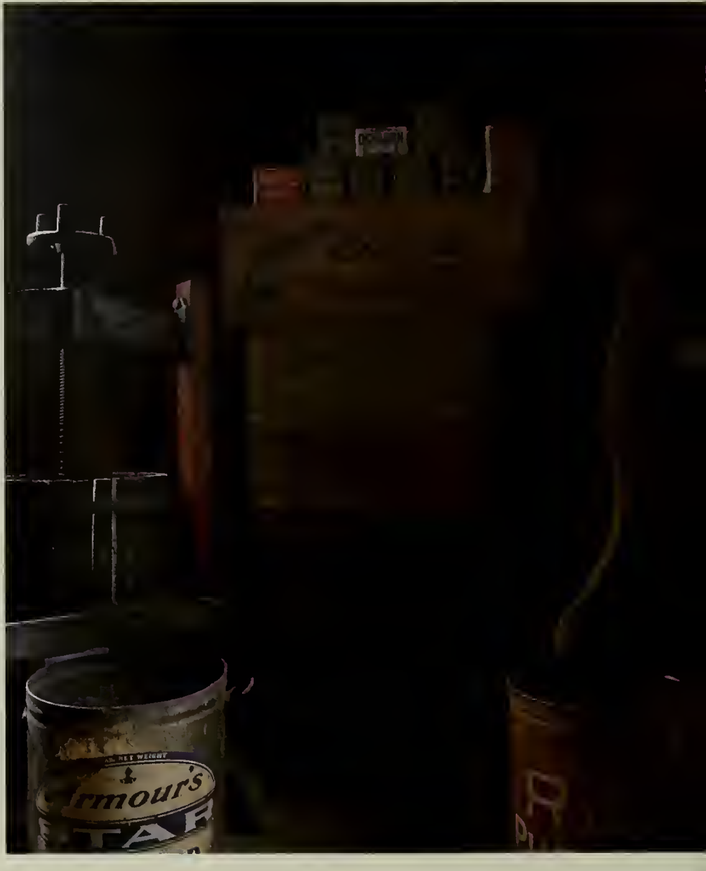
"In the summer, we hire between 35 and 40 naturalists or historians as well as young people who are majoring in the natural sciences, recreation or history. They are hired to work on a specific site to conduct various types of programs, involving as many people as possible, to help them understand the natural and cultural significance of the site. Of course, the regional naturalists work with the summer staff in helping them prepare a full program. We have had tremendous turnouts of people who have become involved in these programs, and we have had many, many letters of compliments about our programs."

Another thing which has had considerable effect on the system is the Heritage Trust Program. "In my estimation, it has been one of the finest programs that has been implemented in recent years," Mr. Struble observed. "It has reflected greatly on our parks and historic sites in that we have been able to buy some very crucial or important inholdings where people actually lived within the park boundary. We have also been able to buy additional tracts of land for park purposes. And, of course, the same thing applies to historic sites where there is a problem of encroachment or possible encroachment. We can acquire the land, more or less stop the encroachment and expand the site. The Jarrell Plantation is one historic site that came into state management through the Heritage Trust Program."

One of the division's current challenges is to provide better recreational opportunities throughout the system for people who are handicapped. "We are very much aware of the barriers that exist on many of our parks," the director said. "It is difficult in many cases for the handicapped to use the camping and picnic facilities or to go fishing.

"Of course, we have the Will-A-Way Recreation Area for the Handicapped, and in the past, one of every five cottages we have built has been equipped with a ramp

Bill Bryant



Ed Brock

"A state park should be of statewide significance. It should be a large landholding and should have the natural resource base. The cities and counties must take the responsibility for local recreation."

Bill Bryant

going to the door. The bathrooms also have been equipped with wide doors and hand rails so handicapped people don't have any problems using them. All of our new buildings— visitor centers, administrative buildings and interpretative centers—are being built with the thought in mind that we must make it easy for handicapped people to use them.

"We have made a study of four of our parks and requested money in our FY-80 budget to adopt certain facilities on them which can be used by handicapped people.

"We will modify some campsites, make them close to the comfort station, perhaps pave the site and a wheelchair path to the comfort station, make curb cuts and provide fishing docks with wheelchair stops and a rail. In his budget recommendations, the Governor approved $40,000 for this work—$10,000 for each of four parks. Of course, this will just be our first step in really getting out on our parks and attempting to solve this problem."

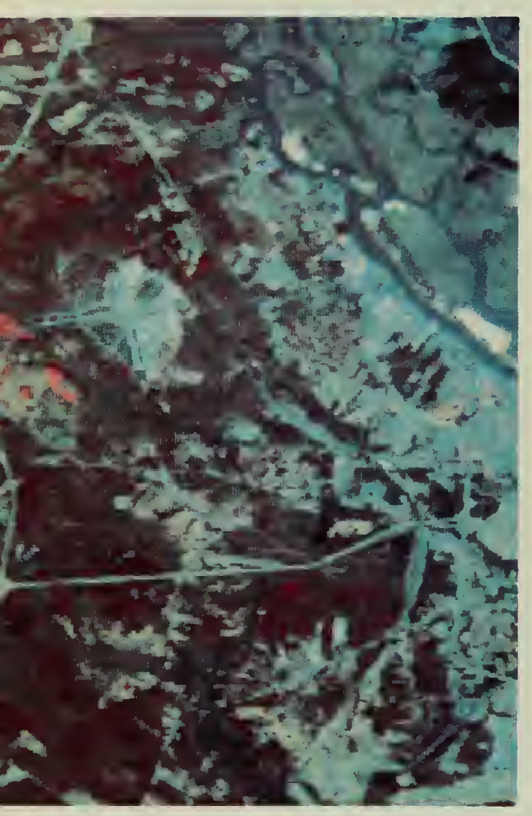
Mr. Struble hopes to develop a very strong technical assistance program to help cities, counties and private organizations with historic preservation and the development of parks and outdoor recreation programs. "The point I must make here is that DNR state parks and historic sites can't provide recreation to everybody in the state," he said. "I think that by establishing a strong technical service and assistance program we can help cities and counties fulfill their responsibilities for providing recreation services or promoting historic preservation at the community level.

"I feel that small areas within city limits are a city's obligation. It is the city's responsibility to establish a park. The same is true of small areas in the county. A state park should be of statewide significance. It should be a large landholding and should have the natural resource base. The cities and counties must take the responsibility for local recreation. If we can provide them with the information and funding through the Land and Water program, it will take the pressure off the state to develop recreation areas within cities and counties. It will also insure that the day-to-day needs for recreation services will be provided where people can easily avail themselves of them. But it's like a child, you know. You have to help it learn to walk. That's what we feel like we are doing with our technical services programs. And through the Land and Water funds, we make the money available through application. We assist them in any way we can to make them self-supporting or self-sustaining."

Georgia's system of parks, recreation and historic sites is so widespread and diverse that it is an enormous job simply to keep track of all the programs and maintain buildings, equipment and grounds and keep everything in neat operating order. But it is easier than it might be. "I think we have been very fortunate in years past," Hank Struble said. "We have had some vandalism but not a great deal. Our philosophy is to keep all the facilities in as good shape as possible hoping the visitors will appreciate this and, as a result, will help us maintain our parks and historic sites in good condition." ●

LANDSAT
A Distant Perspective

by Lucy Justus



A Landsat view of Savannah. Note the Savannah River, the Savannah airport, I-95 (running north-south) and I-16 (running east-west) and the city itself on the right. The image is color enhanced to replicate a color infrared photograph.

It seems incredible that a satellite, orbiting more than 500 miles above the earth, can "see" a 1.1-acre tract of water well enough to tell if it is clean or muddy. But two natural resources satellites—Landsat B and Landsat C—do that.

They also delineate marshland, forestland, cropland, pastureland, bare soil, urban development and a number of other things. They can even distinguish between major crops.

Landsat, formerly known as ERTS (Earth Resources Technology Satellite) is an earth-orbiting satellite which transmits a steady flow of information about the earth's surface to ground-based receiving stations. It is an effective tool for inventorying and analyzing natural resources and is being used for this purpose by many federal, state, regional and local agencies as well as private entities. The new satellite technology requires relatively little investment but yields important benefits to decision makers. Its principal advantage is that, for many applications, it can provide more useful information on a more timely basis and at lower costs than other available data sources.

Landsat orbits the earth 14 times each day at an altitude of about 560 miles. Each satellite returns to the same orbit every 18 days recording the same series of images. There are two sensor systems on board, a Return-Beam Vidicon (RBV) system, which is basically a television sensor, and a multispectral scanner (MSS) which records differences in sun reflectance from earth-surface features.

The multi-spectral scanner records information in both the visible wave lengths and in parts of the spectrum which are invisible to the eye and to camera systems. The MSS takes four readings for each 1.1 acre area on the ground—one for the intensity of green light reflected, one for the intensity of red light reflected, and two for the intensity of infrared. These intensity levels are converted into computer form and are transmitted back to receiving stations on earth.

When the data is projected on a color television type screen and a specific category marked, the computer can be commanded to print out all the similar areas in the frame. Thus by pushing a series of buttons, the operator can quickly learn the number of acres occupied by any category. The system can print out either a single category or combinations for any area indicated. The area may be a county, several counties, a swamp, a watershed, a wildlife management area . . . . By processing 14 frames, data can be obtained for the entire state.

"The four filters, or scanners, in the satellite assign a value of 1 to 64, within each of those filters, for every 1.1-acre cell," explained Bruce Rado of the Environmental Protection Division of the Department of Natural Resources. "When you outline an area that has values of, say, 4 to 5 you are saying to the machine, 'Okay, on the computer tapes, find all the other 4's and 5's and assign an orange or red or whatever color to them on the map.' By instructing the system to find all the values and assigning a color, the user is then indicating where, for example, all pastures or cultivated areas are located."

For the state's water quality managment program, a notebook was recently compiled for the Environmental Protection Division, listing the statistics in all categories for each of the 198 watersheds in the state. "If you are dealing with a certain water quality management unit, it can be important to know, for example, how many acres of high-density urban development there are within the unit," Bruce Rado said. "High-density urban areas have certain runoff characteristics. There are petrochemical residues on the roads, and when it rains, they surface and wash off. And if you know how much bare soil there is in a watershed and what the hydrological conditions are, you can begin to make assumptions relative to how much of that soil will get to the rivers and streams of the area."

One of the more interesting things about the Landsat work is that a map showing data from one year can be superimposed over one containing information from the previous year and the computer can be instructed to print out areas of change. In effect, the operator says to the machine, "Show me the areas which have changed and tell me what was there a year ago and what is there now." The same thing, of course, can be done monthly or seasonally.

The system gives users an opportunity to see where major changes are occurring, and it can show wildlife managers how much more (or less) habitat, such as wetlands, forests or agricultural lands, are available.

The satellite data may be helpful to those responsible for the safety of dams and drinking water in the state. "We are trying now to see how successful we can be in delineating surface water impoundments," Bruce Rado said. "It is very hard to do water inventories from photographs because it takes so many. And it is hard to see every 1.1-acre cell. But when we put the computer data on the TV screen, we can enlarge those cells so we can see every cell of water."

The potential problem is the clarity and accuracy of the image. In scanning a tiny body of water, the satellite may not be able to define the boundaries precisely, especially if there are sandbars, mudbanks or close surrounding vegetation. "Since we can pick up impoundments which are five acres or larger in size, there is a good possibility this technique could be used with U.S.G.S. quadrangle maps as a good first cut in a statewide surface water impoundment inventory," Bruce Rado said. "It could also be used for updating U.S. Geological Survey quadrangles. If a quadrangle is 10 or 15 years old, a new impoundment may have been built or an old one may have been drained. In addition, it would be helpful to know of any changes prior to any type of field investigation.

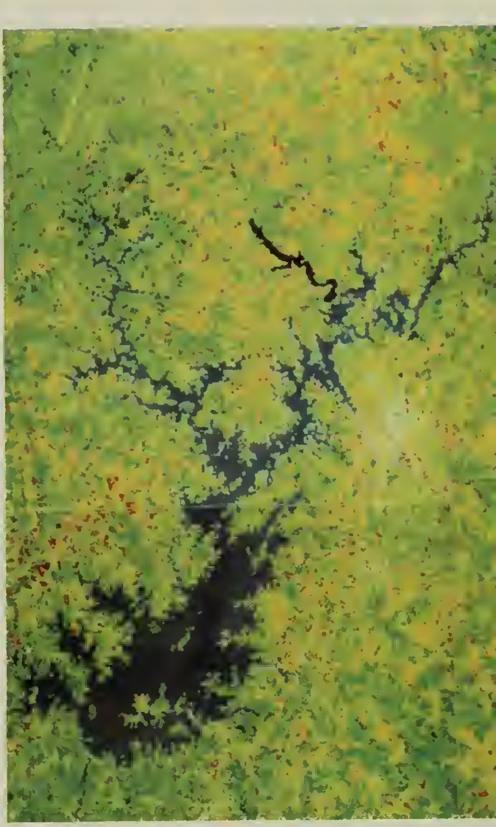
"The Forestry Commission and industry recognize the increased demands they will experience for timber resources 25 years from now," Rado observed. "People have to start planting now to meet that demand. We can use the satellite data to find out where all the fallow areas are. Where are those areas which are sitting bare and should be planted?

"A lot of times industries request data from the Forestry Commission. A company will ask where, in a 25-county area, to locate a forest processing plant, based on the availability of new timber coming in. The Landsat data can help answer such questions.

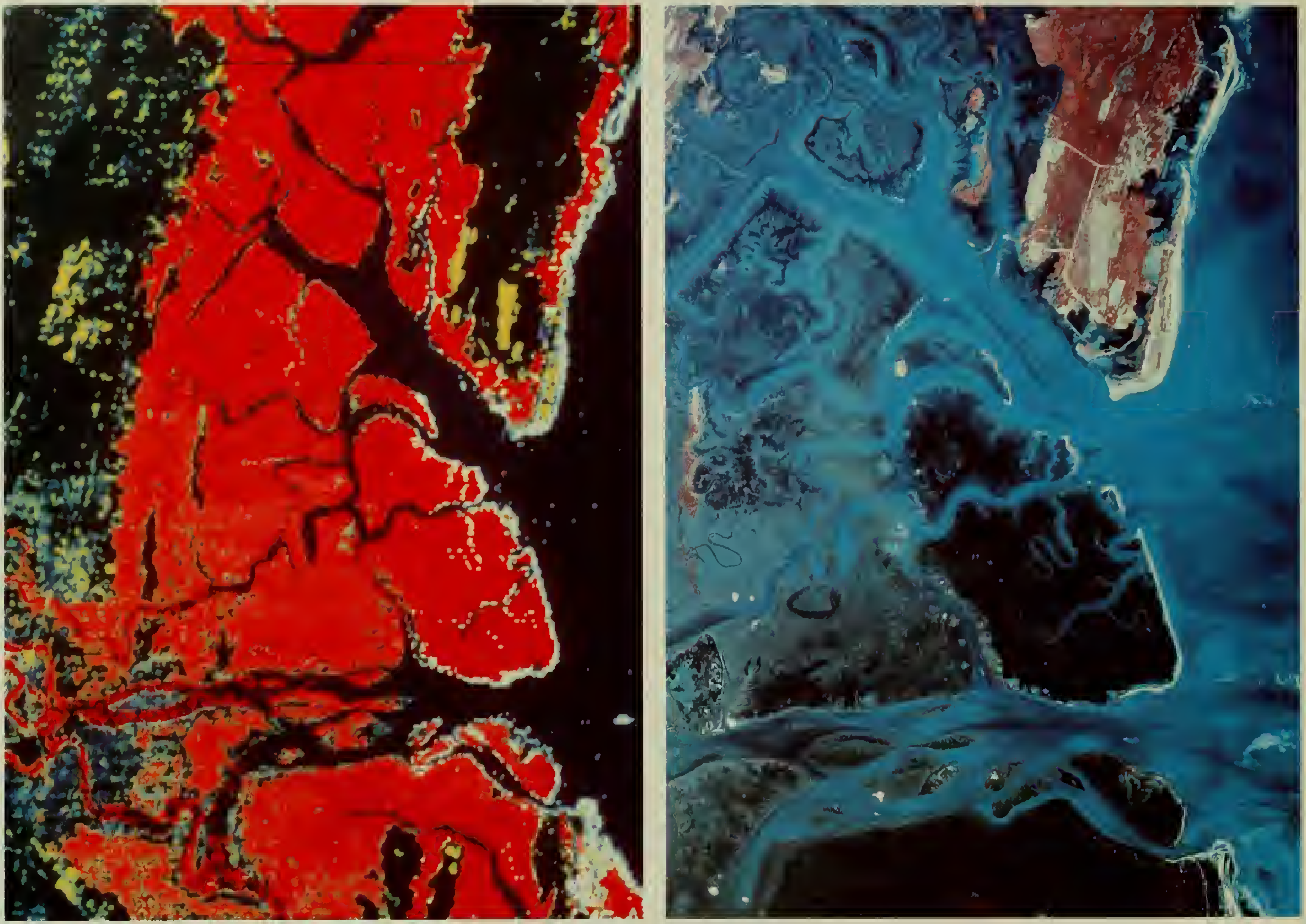
"Landsat might also be of assistance in market forecasting. NASA has been relatively successful in using the satellite to distinguish major agricultural crops," Rado said. One advantage of the Landsat program is that the data is extremely current and provides complete coverage of the state every nine days.

Although there are three Landsats now in orbit, only two are operating. Landsat A was launched in the summer of 1972 with a life expectancy of one year. It was still functioning when it was turned off in 1978. Landsat B was launched in the winter of 1975 and Landsat C in the spring of 1978. The state is currently using tapes from A and B and will soon begin to process the C tapes.

"We began using the Landsat tapes to evaluate them back in the



This picture of the processed (classified) Landsat data shows Lake Lanier and the Gainesville area. Each of the dots of color represents 1.1 acre on the ground. The map is color-coded: green is upland forest, yellow is pasture, blue is water, red is cleared land and white is urban area.



This picture of processed (classified) Landsat data (above left) shows the Altamaha Sound and Sapelo Island. Note the different marsh grasses in red, the upland vegetation in green, upland grass areas in yellow, water in blue and beaches and sand bars in white. The high altitude infrared photo (above right) is shown as a comparison to the Landsat product.

fall of 1974," Bruce Rado explained. "At that time 14 southern governors had requested that NASA assist the Southeast through aerial photography and satellite data. NASA offered to have several individuals from southern states go down to the Earth Resources Lab at NASA for a three-day demonstration on how to use satellite data.

"Then the state of Georgia, through the Office of Planning and Budget, asked NASA if we could have a non-monetary technology transfer with NASA. NASA said they would be willing. They would put up some of their people and equipment and Georgia would put up some of its people, and we would structure a program which had basically two parts.

"One was the opportunity to use NASA's people and its equipment, along with Georgia's people, to do several demonstration projects around the state. From that, if the state deemed those demonstration projects useful or significant, NASA would be willing to give us the software and continue training to help us.

"The initial demonstration project involved people from the U.S. Army Corps of Engineers, the Soil Conservation Service, the Georgia Forestry Commission, the state Office of Planning and Budget, the Department of Natural Resources and some other groups.

"While we were working on the demonstration project, DNR personnel got together with the Georgia Tech Engineering Experiment Station. They found some ways we could help Tech and Tech could be of assistance to us. While we did the demonstration project, Tech ordered and installed the equipment we use in working with the Landsat data. So it has been a cooperative project."

And one which has been helpful to many people. ●

DNR
Summer Events

Gem and Minerals Day
Dahlonega Gold Museum
June 2

Mountain Living Weekend
Unicoi State Park
June 15-17

Indian Artifacts Identification Days
Etowah Mounds Historic Site
June 16-17

Great Outdoors Experience
Unicoi State Park
June 22-24

Astronomy Week in Georgia
All parks and historic sites
June 25-July 1

Life of a Civil War Soldier
Cloudland Canyon State Park
June 23

Fishing Contest
All state parks
Month of July

The Fourth on the Farm
Jarrell Plantation
July 4

Second Annual Model Airplane Fly-In
Georgia Veterans Memorial State Park
July 4

Fourth of July, Mountain Style
Unicoi State Park
July 4

Independence Day Mountain Rendezvous
Amicalola Falls State Park
July 3-4

Let's Energize
All mountain parks
July 7-13

Third Annual Appalachian Music Festival
Unicoi State Park
July 13-14

Sherman's March to the Sea
Ft. Mountain State Park
July 21

Great Getaway
Crooked River State Park
August 3-5

Life in the 1860s
Sweetwater Creek State Park
August 4-5

Andrews' Raid and the Great Locomotive Chase
Red Top Mountain State Park
August 11

Atlatl Throwing and Demonstration
Etowah Mounds Historic site
August 11-12

Georgia Mountains Eatin's and Squeezin's
Unicoi State Park
August 17-19

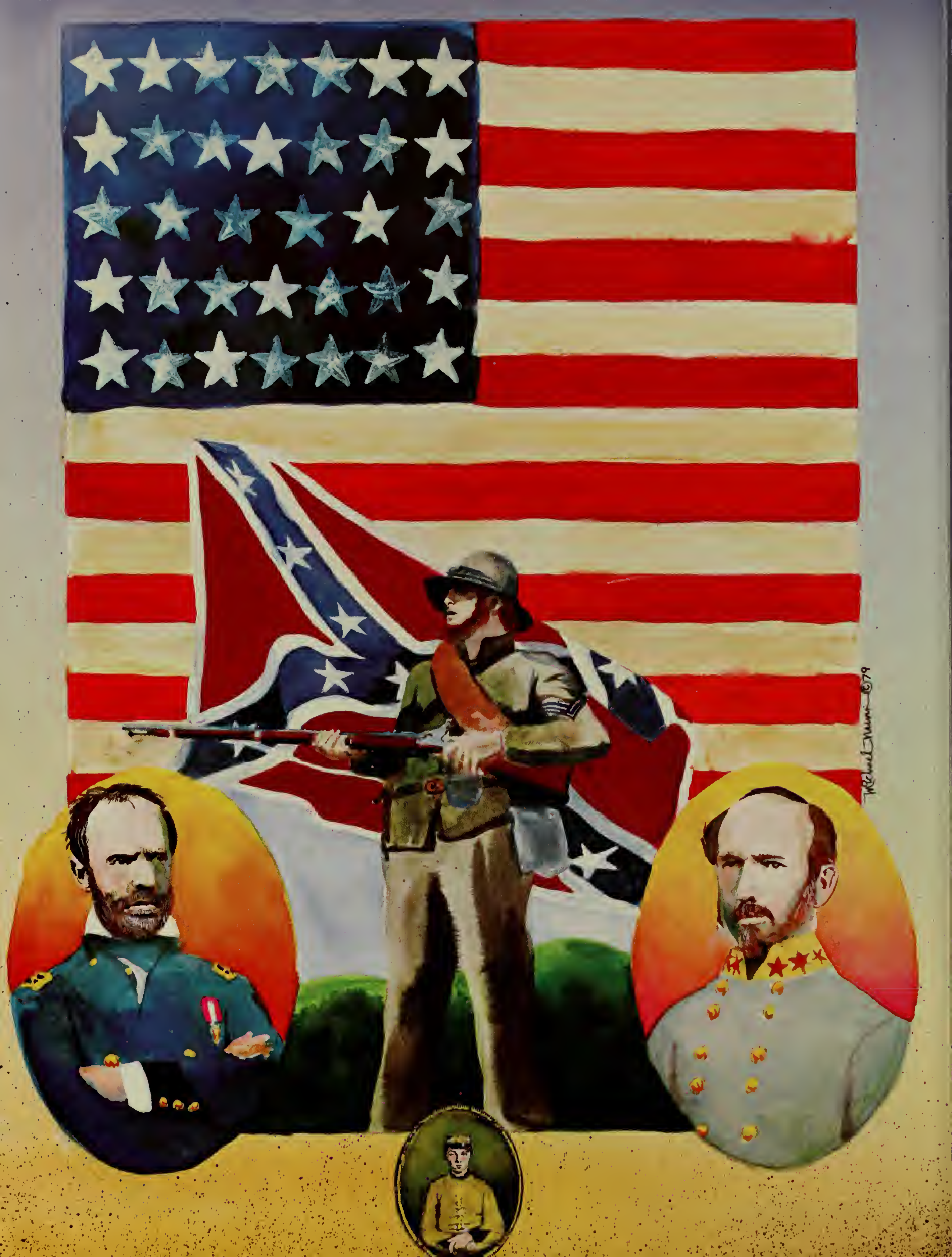
Clothesline Arts and Crafts Show
Moccasin Creek State Park
August 25

Let's Play in the Parks
All parks and historic sites
September 1-3

Labor Day Weekend Harvest
Jarrell Plantation
September 1-3

Golf Clinics
Hard Labor Creek State Park
Contact the park office for information. (404) 557-2863.

Don't Miss Fishing Contest
All state parks
Month of July
Catch the largest bass, bream or catfish, the longest mountain trout or the longest saltwater speckled trout at a state park during July and win a free weekend at a Georgia state park cabin. Contact park offices for details.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KENNESAW
the battle before Atlanta

One's memories of the battle depend on whether one was a general or private.

by Steve Hudson

Kennesaw doesn't scream anymore. Today it only whispers, and the murmurs of the birds and the sighs of the flowers are the only sounds. But it wasn't always so. Once its slopes shrieked cannon shell and fire, but that was a hundred years ago . . . a long, long time. Now, if you stand at the top of Kennesaw, the wind carries only the sound of the breeze or of the traffic far below.

But if you listen . . . if you really listen, the echoes are still there: echoes of cannon and of rifles, of the shouts of soldiers and the moans of men. Who were these men? Who were the generals and the privates that met here that hot, muddy summer so many years ago? These are questions you can't help but ask, and the answers are still there. All you have to do is listen. . . .

By the spring of 1864 the armies of the North and of the South had been letting each other's blood for three long years. In the East the battle lines wavered between Washington and Richmond, having changed little since the war began. But in the West it was a different story. The West, in the 1860s, was that expanse of land between the Appalachians and the Mississippi River, and it was there that the federal armies had made many of their advances. In 1862 they drove the Confederate Army from Kentucky and from a large part of Tennessee. They pushed on to take control of the Mississippi and even of Chattanooga itself. And now, as the wildflowers once more began to bloom, they were preparing to march from Chattanooga into Georgia to take what one northern paper had called "the great military depot of Rebeldom"—Atlanta.

Second only to Richmond in its importance to the Confederacy, Atlanta was the transportation and supply center for Confederate troops in Virginia and in Georgia. Sherman's orders were clear, too: ". . . get into the interior of the enemy's country as far as you can, inflicting all the damage you can against their war resources." To this end he had amassed three armies totaling over 100,000 men, and with them he made ready to march into Georgia and ultimately to the sea.

Sherman had prepared well. He had the men and the resources to make his operation succeed. In fact, there was but one catch—General Joseph E. Johnston, the Confederate general charged with halting Sherman's advance, and his relatively tiny army of some 60,000 men.

A graduate of West Point, Johnston had been a U.S. Army man until Virginia seceded in 1861 and he went to serve the Confederate cause. Rising quickly in the Confederate Army, he was appointed commander of southern forces in the West after just two years. His orders, too, were explicit: defend the western front from further advances by the federal troops.

"Old Joe" must have been quite a figure. He was a slightly-built man about fifty years old, and those who knew him often noted the "intelligent face," that "honest countenance," and those keen and expressive dark blue eyes that probed a man to the core. He was the picture of the textbook soldier, from the impeccable uniform that he always wore to the details of the trappings of his saddle. And his hat, with its feather and its star, completed the picture perfectly.

Indeed, one of his men once described him as a "perfect dandy." But General Johnston had their respect. He had, too, a rare and almost magical ability to incite loyalty. When he took charge, the Army of Tennessee was a discouraged and disheartened

Illustration by Mike Nunn

[illegible]—VIEW OF KENESAW MOUNTAIN, FROM LITTLE KENESAW.—[SKETCHED BY T. R. DAVIS.]

GENERAL SHERMAN'S ADVANCE—LITTLE KENESAW, [illegible] 1864.—[SKETCHED BY T. R. DAVIS.]

group of men, torn and tattered and sick at heart. But Johnston restored their spirit. He ordered extra rations, new tents and luxuries like tobacco and an occasional sip of whiskey. He mingled with them, felt their needs and earned their undying devotion in the bargain. He made his men proud again and his army grew stronger for it.

Unfortunately, though, for all of his rapport with his men he was one of those figures who could not manage to mesh with his superiors. Unlike Sherman, who seemed to get along well with just about everybody, Johnston got along with almost no one but his men. Always a secretive and stubborn figure, he made no efforts to be otherwise with the Confederate high command—a situation that no doubt had much to do with Johnston's replacement shortly after Kennesaw.

Even so, he might have been successful and kept his command. But he was a man wholly limited by the weave and stretch of a personality that would not permit him to manage the decisive, sometimes daring moves often expected of a commander. He seemed insecure, often wavering and uncertain over command decisions, and even the men who would have gladly died for him could look back after the war and say that perhaps he really did falter when he should have pushed on.

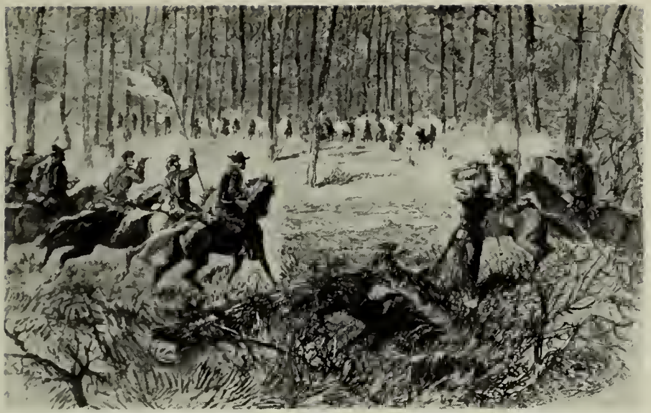
But they never forgot that he was first and forever a military man, just as the Union never forgot that he was a formidable foe. Indeed, the northern commanders saw his replacement with great relief. General Grant once told Sherman that of all the Confederate generals, Johnston was the only one whom he truly feared. And Johnston showed why at Kennesaw.

Kennesaw was one of the last barriers that could be used against Sherman in his approach to Atlanta. Johnston, with his smaller force, had little hope of winning in an open battle; instead, he felt his best bet to be to find defensive positions near his supply line (the railroad) that would strategically favor his more limited numbers. Suitable terrain would almost disappear once they passed Kennesaw and crossed the Chattahoochee, and Johnston knew that his hope lay in the hills and valleys to the north of the river.

First at Resaca, and then at Adairsville, Cassville and other points between Chattanooga and Atlanta, he tried to set up and hold a position. But Sherman saw this tactic and developed a flanking strategy to threaten the southern supply lines. This, he reasoned, would force Johnston to give up either his position or his source of supply; Johnston, as expected, consistently chose to protect his supplies.

By the first of June the armies were nearing Atlanta. Sherman's flanking tactics had repeatedly forced him to move. Nonetheless, he continued his search for a defensible position, and on June fifth he began to move men to the vicinity of Kennesaw. There, at last, it seemed that he might have found the spot he had sought for so long.

The mountain quickly became a fortress. Substantial earthworks went up, and trenches and rifle pits went in as well. The terrain itself was favorable, too. Already rugged, it was rendered even more so



These old woodcuts (opposite page and left) depict Sherman's attack on the Confederate troops at Kennesaw and Union forces moving through Marietta.

when the Confederate Army moved in. Cutting trees at head height, the soldiers toppled them down the hill to produce a tangled mass of undergrowth and tree limbs that was almost impossible to negotiate. In some places this was supplemented by tangles of telegraph wire, too, and the resulting confusion of branches and snags might have slowed even a squirrel or a rabbit.

This, no doubt, gave Sherman something to think about. But there was more. The rains that had been pouring down for weeks had turned the roads into unending stretches of mud, effectively immobilizing Sherman's flanking forces. By the nineteenth of June the southern forces were secure on the mountain; Sherman was virtually stuck in the mud below.

Action now became limited to skirmishing in the vicinity of the Confederate lines and to one major engagement at the Kolb farm, several miles south of the main lines. The Confederate forces fared poorly at the farm, though, and the taste of battle and of victory only made the Federal troops eager for a larger match. They were growing impatient with the endless flanking movements, the mud, and the perpetual rain. They wanted a chance to fight.

They wanted it, and it came. Toward the end of the month the weather finally began to improve. Sherman, still faced with muddy roads, was unable to use his flanking techniques. However, he was at least able to move, and on June 27, about nine in the morning, he launched two simultaneous fullscale attacks on the Confederate lines.

Sam Watkins, a soldier on that part of the line called the Dead Angle, remembered the morning well. At last the rains had stopped; the sun rose that morning on a cloudless sky, and in the woods there was no sound ". . . save a peckerwood on a neighboring tree." In the distance his company could see the Federal soldiers hurriedly moving about, and everyone on the line knew that something was about to happen.

Suddenly the firing began. To Sam Watkins it seemed as though everything suddenly began to happen at once. "A hundred guns" opened up on the point of the line that his regiment was defending. And even as the pickets came running back to the trenches yelling that the Yanks were finally coming, a "solid line of blue coats" began to advance up the hill.

Most of the attackers never lived to reach the line. The Confederates fought fiercely—"no sooner would a regiment mount our works than they were shot down or surrendered"—but the northern troops came on. Fighting got so close that the fire from the Federal guns singed the defenders' hair, and the concussions from the shooting ". . . caused the blood to gush out of our noses and ears . . . ." Wounded and dead Union soldiers were everywhere. More fell every second, too, for ". . . all that was necessary was to load and shoot." Again and again the advancing northerners were beaten back, each time with horrible losses, until their advances were at last impeded even by the thickly strewn bodies of their own wounded and dead. In the Confederate trenches there were relatively light losses though the men were "wet with blood and sweat." And still the sun shone down.

It was a strange kind of battle. Once, when the powder blasts set fire to the undergrowth and threatened to burn the wounded men alive, Colonel William Martin, leader of two Arkansas regiments, leaped from his trench waving a white flag and yelled for the Federal soldiers to come drag their wounded to safety. For a moment there was a benevolent ceasefire on that one small part of the line, but as soon as the wounded were moved it was business as usual once again.

Eventually the Federal troops fell back and dug in. At the Dead Angle, which turned out to be one of the most fought-over points of the battle, they entrenched

Ed Brock

The scene at Kennesaw today (left), and after the battle in 1864.

themselves within thirty yards of the Confederate earthworks—so close that the Southerners could (and did) throw rocks at them. It was a strange kind of war.

For three days the armies remained in position, always accompanied by the cries and screams of the wounded, and on the third day the two sides declared a truce to bury the dead—not from any great respect for the deceased but simply to "get rid of the sickening stench." After the burial the remaining time was spent in visiting between the men of the two sides. Thomas Upson, a Union soldier present at the time, recalls that they showed much "kindly interest" in each other, and when the gun sounded at the end of the truce, the two sides parted with cries of "I hope to miss you, Yank" and "May I never hit you, Johnny." Then parting, they returned to the trenches; the grimness returned, and the war began once more.

But now the weather had improved considerably. The summer sun had at last shown long enough to dry out the roads, and Sherman was once more able to move to threaten Johnston's supply line. On July 2, Johnston abandoned Kennesaw to keep from being cut off. He continued to give ground, and seven days later he had crossed the Chattahoochee, the final barrier between Atlanta and the Union armies.

Johnston was relieved of command on the seventeenth of July. For that the North rejoiced, and soon thereafter Atlanta fell.

Today, Kennesaw is a national monument, one of the last remaining battlefields from the Atlanta campaign. Easily accessible from Interstate 75, the park lies just north of Atlanta and is a must if your interests are bent toward history. At the National Park Service visitor center, you may view a brief program describing the battle and tour a museum containing an impressive array of artifacts from the battlefield and from that time. Afterwards, if you wish, you can take either a paved road or the well-marked foot trail to the top of the mountain.

During the summer months you get to experience a real bonus. Beginning in mid-April, Park Service volunteers don authentic Civil War garb and set up camp on the grounds. Part of the "living history" program, this is designed to give you a feel for what life must have been like for a soldier—and it succeeds, too, sometimes making you wonder where you can go to enlist. In May the infantry add cannon demonstrations each Sunday as well. It's quite a spectacle, and it continues into September.

Throughout the year the park has plenty to offer. There are no facilities for overnight camping; however, the park has picnic areas and an impressive array of hiking trails as well. Visit Kennesaw sometime. Take one of the trails along the old southern line. See the hawk soaring high above, and feel the glow of the sun on the hillside and the flowers. These things are there.

And if you listen. . . . ●

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July 1972-June 1977

Compiled by Brenda Lauth

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Georgiology—Panola Mountain	December	72	17
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Take home a memory from CHRIST CHURCH

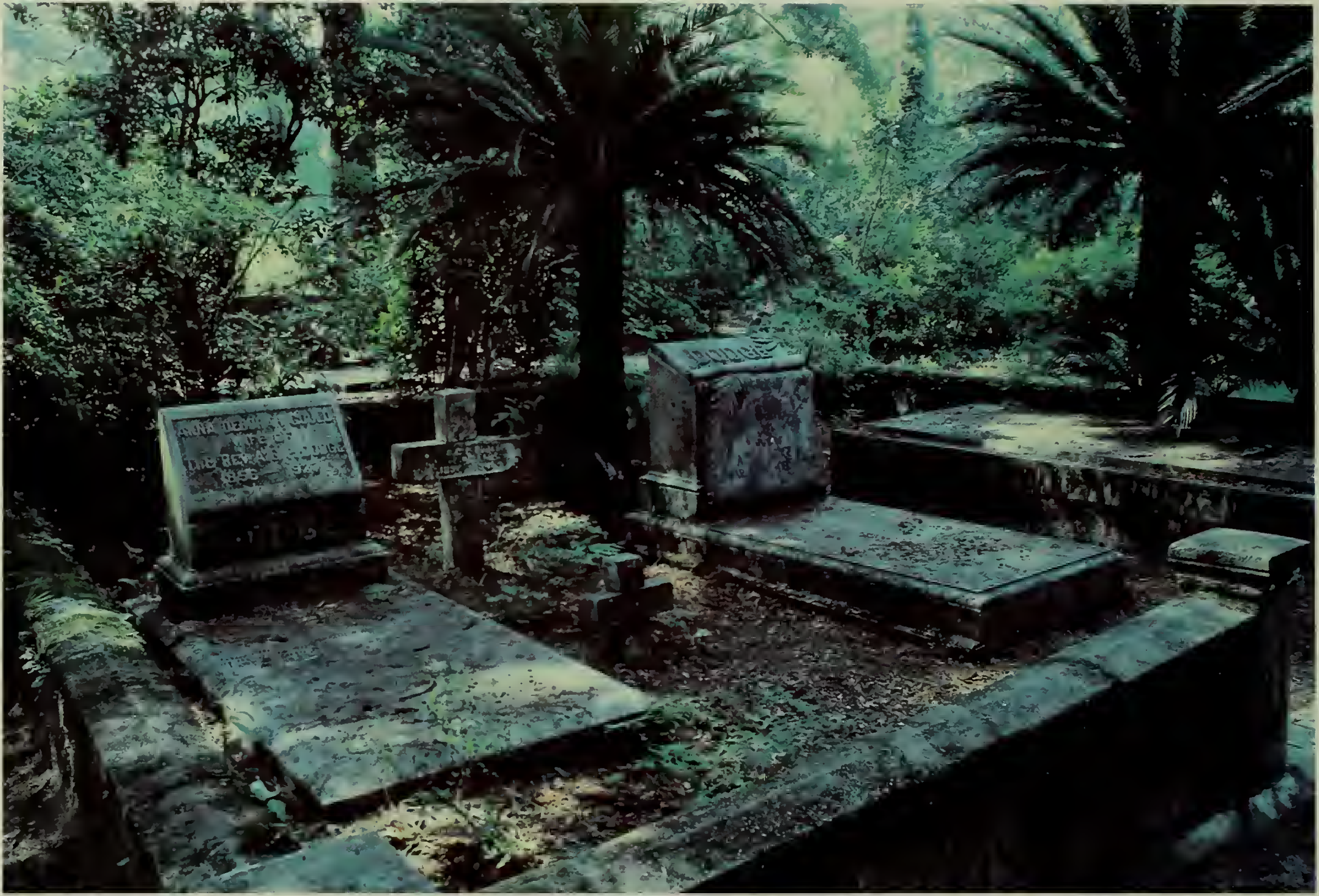
by Barbara Crozier Couch
Photos by Jim Couch

A church hardly larger than a chapel holds much interest to visitors to St. Simons Island. Christ Church is a small white wood-frame structure built in the shape of a cross, very similar to typical English country churches. Stained glass windows given as memorials by parishioners depict the early history of the church and the life of Christ. Only about 200 of the approximately 2000 membership can be seated in the little sanctuary at any time, and Easter and Christmas services draw turnaway crowds of members and visitors alike.

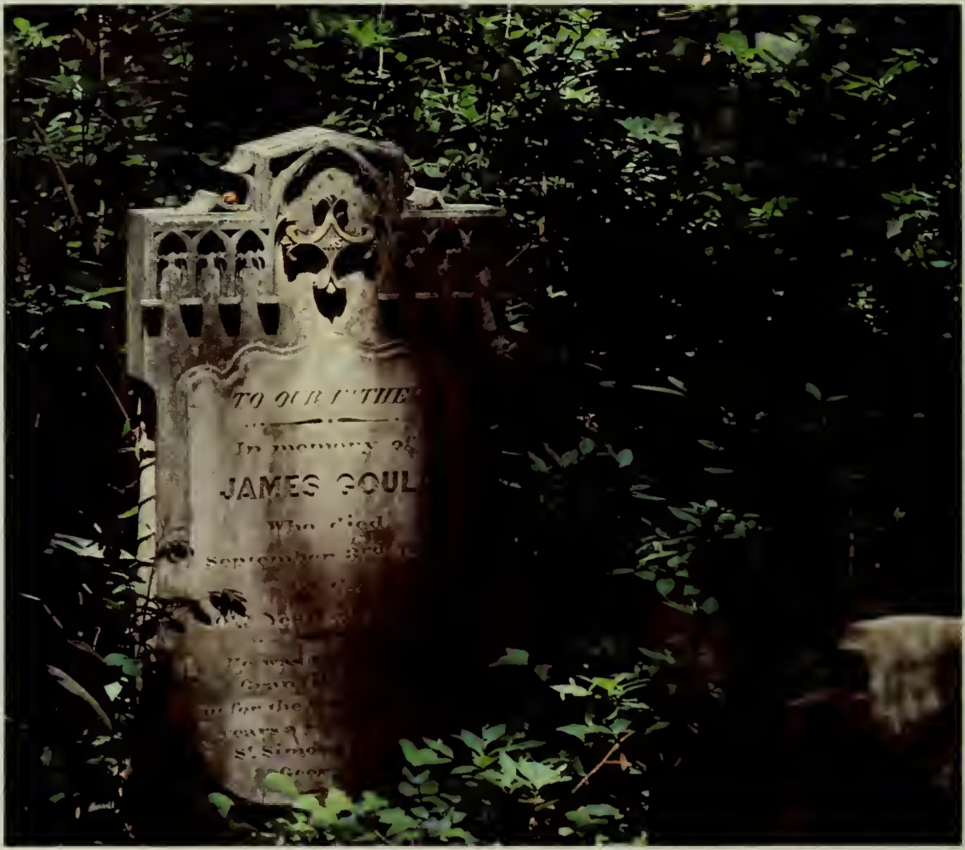
Why does this small church have such great appeal? Built in 1884 by Anson Phelps Dodge, Jr., the present structure sits serenely among centuries-old live oaks. Many of the island's first residents rest in the surrounding cemetery where tombstones date back to 1803. Weathered stone memorials amid moss-laden oaks and palm trees create a strange quietness among visitors seeking grave sites of family names such as Gould, Dodge, Postell, Couper, King, Hazzard and Demere. The history of the little church spans generations dating to pre-Civil War days.

Although the parish is Episcopal, the church bears a connection to the Wesley brothers, founders of Methodism. John Wesley reportedly preached to General James Oglethorpe's troops and settlers residing at nearby Fort Frederica under the massive live oaks. A historic marker outside the church wall commemorates the renowned Wesley Oak, which is generally believed to be in the vicinity.

The first Christ Church was built in 1820 by the owners of plantations on St. Simons. As the Civil War's ravages drew closer, most residents temporarily left the island, and the church was left in ruins by the Fed-



The graves (above) of the Dodge family are often visited by people coming to Christ Church. Anson Dodge built the little white church in 1884 and became its minister. (Right) The marker of James Gould who built the original St. Simons lighthouse. (Opposite page) Rubbings of the graves in the cemetery at Christ Church have damaged many of the markers.



Barbara Crozier Couch is a free-lance writer who is employed in the Administrative Services Division of DNR.

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eral troops who occupied the island.

After the war, Anson Dodge, Jr., visited the island and, like so many before and after him, fell in love with the people and the land. He brought his mother, Rebecca Dodge, and his fiancee and cousin, Ellen Ada Phelps Dodge, for a visit with the hope that she too would want to settle on the island after their marriage. He was later to rebuild the church and assume the position as minister to the island residents.

But tragedy struck the couple on their honeymoon and Ellen died in India. Anson brought her body back to St. Simons and buried her in the church cemetery. When the church was completed in 1884, he moved Ellen's body to rest beneath the altar.

In 1890, Anson married Anna Deborah Gould, granddaughter of James Gould who built the original St. Simons' lighthouse. When Anson died, Anna carried out the provisions of his will and proved her unselfish love by burying her husband and his first wife, Ellen, in a joint grave. Beside them is buried Anson's mother, in the site that had been reserved for Anna. Their young son, who died in a freak accident before he was three, lies next to his grandmother. Anna now lies at the far side of the family plot.

Many readers of Eugenia Price's St. Simons trilogy visit the cemetery each year to stand beside the Gould family plot, graves of the people whose stories are told in *Beloved Invader, New Moon Rising* and *Lighthouse*. All three are based on actual people and events of St. Simons.

Almost all visitors bring a camera to capture the beauty of the serene little chapel and cemetery. Others, intent on creating a memento or work of art, bring "rubbing kits" bought in art supply stores.

Although church policy does not prohibit rubbings, the parishioners do assume that the public will treat the memorials with proper respect. In the past several years, some markers were damaged by either carelessness, negligence or perhaps even deliberate vandalism by scraping the stones with a sharp object, apparently done to read names and dates more clearly.

But why risk damaging these priceless, private memorials? Photograph them instead.

Some Tips on Making Good Photographs

You might begin with the Dodge family plot, or you might find the grave of John Couper interesting. His marker is over 125 years old, yet completely legible:

> Endowed with a fine intellect, a cheerful
> and amiable disposition, and the most liberal
> and benevolent feelings. His long life
> was devoted to the duty of rendering himself
> most acceptable to his creator, by doing
> most good to his creatures.

Photographs can become real pieces of art and many can be taken in the time it takes to do one good rubbing. Negatives are more permanent and prints can be made as often as necessary, even after the stone has ceased to exist. Also, photography captures the motif which sometimes cannot be rubbed on the upright markers.

First of all, you'll get better results if you photograph on an overcast day when the lighting is even. Next, select your camera and film. Any 35mm single lens reflex camera will produce a good photograph. Slides or prints are equally good. Of course, a tripod is extremely helpful in getting perfect focus and really sharp photos, but hand-held shots can be made if you steady yourself against some stationary object.

To avoid distortion, you should photograph the stone with the lens parallel with the face of the camera. Experiment and take several shots from various angles.

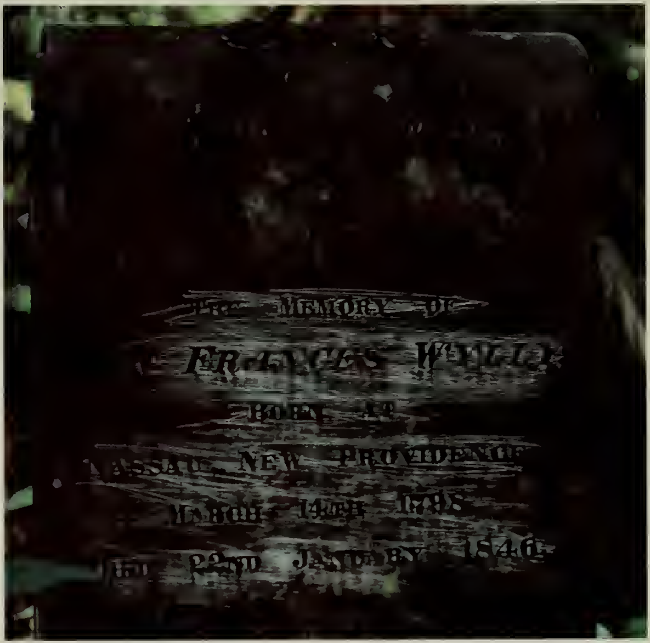
Unless you are compiling a genealogical record, you can use either color or black and white film. If you enjoy developing your own prints, you should try black and white. It records detail and texture nicely because you can play with the contrast in the darkroom.

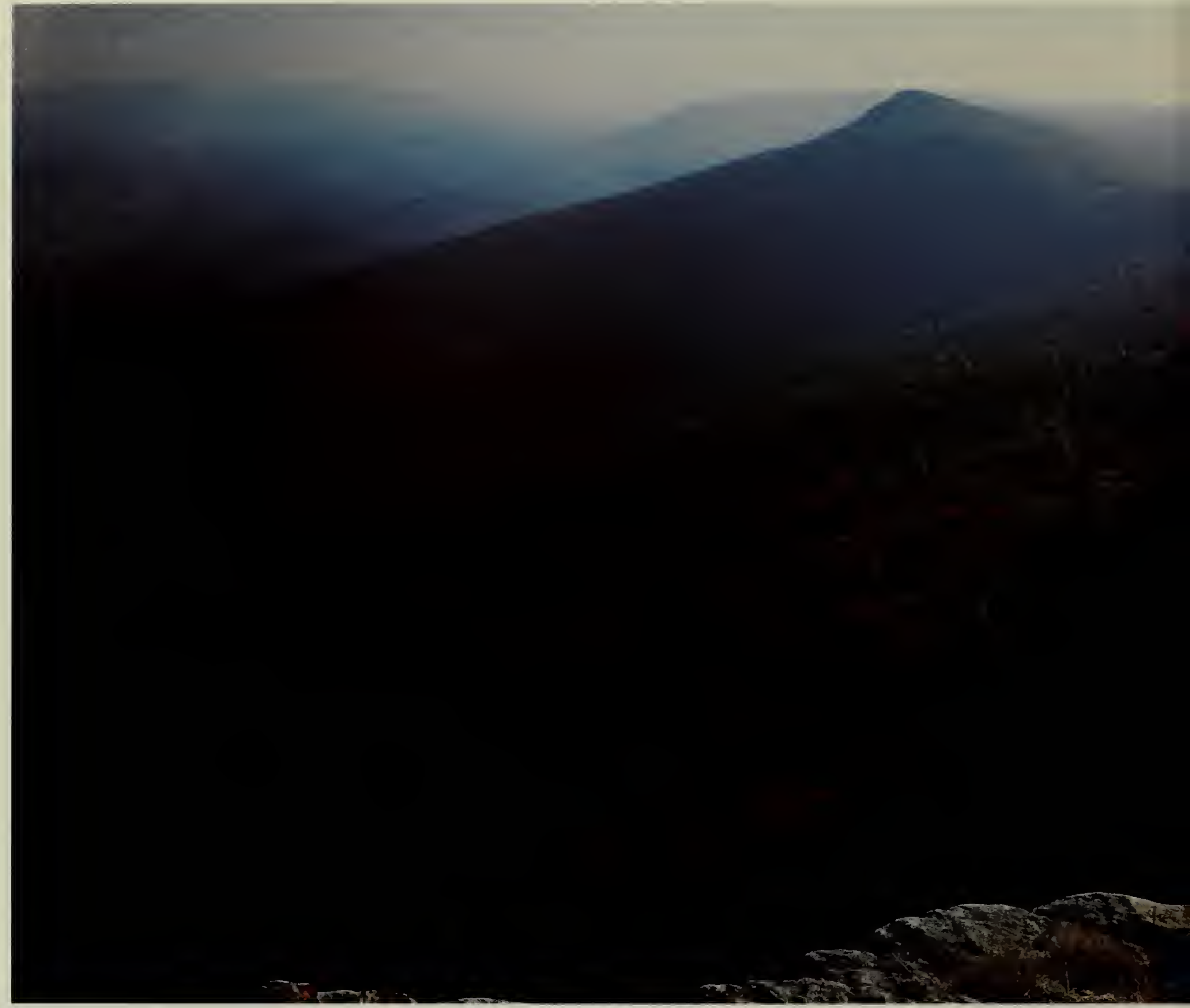
A black and white film with an ASA rating of 125 (film speed) is fast enough to permit hand-held exposures and slow enough to be fine grained. Color film with an ASA rating of 64 is good for the same reasons.

It is probably a good idea to bracket your exposures (take one or two shots on either side of the meter reading) to get at least one perfect exposure. A 50-100mm lens will produce a full view of the stone but you will probably want to get close-ups of interesting detail or inscriptions. For close-ups, use a medium telephoto (85-135mm) lens.

The work involved in getting a good photograph is worth the trouble to be careful. The result can be a valuable historical record, and most important, there is absolutely no damage to the stone.

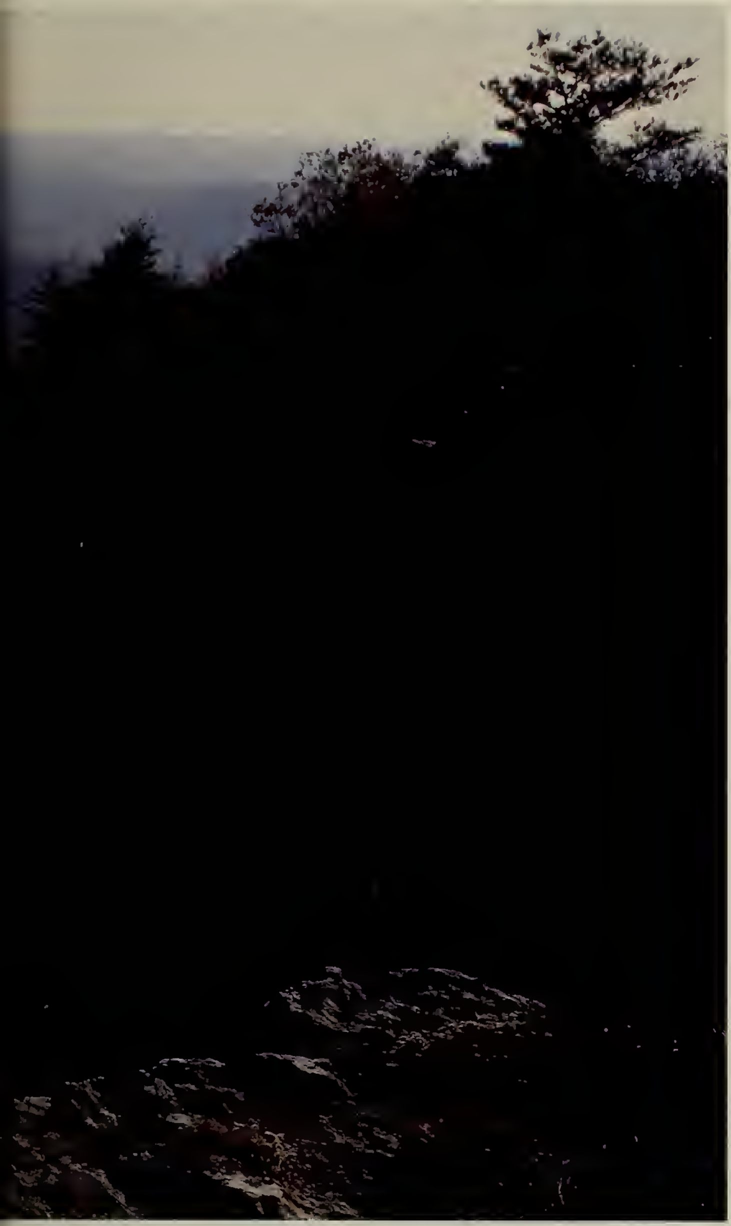
But you need not be a photographer or a fan of Eugenia Price to enjoy a tour of Christ Church. It is enough simply to enjoy the memories you'll take with you: the majestic moss-hung live oaks, the old stone markers, the stained glass windows, the soft, satiny walls, and the view of the little white church through the covered entrance gate. ●





THE STATE OF DADE

by Billy Townsend
Interpretative Specialist



Jimmy Valentine

Looking into Dade County. These ridges separated Dade from the rest of Georgia until 1940.

and other stories

In the annals of Georgia lies the history, or near history, of a county that seceded from the state, three out-of-state counties, one empire, one independent republic and several counties that changed their names.

State of Dade

Columnist H. L. Mencken once wrote a history of the bathtub in America that was a complete fabrication but with some very convincing names, dates, and places (like the White House). This yarn was soon appearing in learned journals as absolute historical fact. Mencken, being Mencken, savored his joke on the world for a few years before he set the record straight. He later wrote, "What ails the truth is that it is mainly uncomfortable, and often dull." The lasting story of the "State of Dade" bears out his axiom.

The story is told two ways. One version has Dade County seceding from the Confederacy and flying the "Star Spangled Banner" throughout the "late unpleasantness" because of strong Unionist support. The other version has Dade seceding from the Union first because Georgia was too slow and even flying the Confederate flag for years after the war. The latter is the most popular version, and I do mean popular.

On July 4, 1945, over 4,000 people attended a celebration at Trenton when Dade graciously struck the Confederate banner, raised Old Glory and rejoined the Union. This celebration attracted national attention and even a congratulatory telegram from President Harry S. Truman. Everyone enjoyed the occasion and it left a lasting impression in the minds of Georgians.

One of these minds belonged to E. Merton Coulter, one of Georgia's most respected and best loved historians. Dr. Coulter looked very carefully at the records and concluded that this most popular story was not true. In fact, Dade's two delegates to the secession convention voted against secession. Nevertheless, Georgia did secede in January 1861. Dade Countians immediately joined the Confederate Army in quantity and served their new nation well in units like the Yancey Invincibles, the Lookout Dragoons, the Dade County Invincibles and the Racoon Roughs who wore coonskin caps. Dade County men saw action at Manassas (1st and 2nd), Fredericksburg, Cold Harbor, Gettysburg, Vicksburg and most of the major battles.

As for the "State of Dade," it did exist in a physical sense until 1940. Dade is tucked into the northwest corner of the state behind the steep slopes of Lookout Mountain. Until the completion of Georgia 143 (Old S.R. 2) Dade was accessible only from Alabama or Tennessee unless the traveler had the skill of a mountain goat. Until the all-weather road went through, Dade had been tied to the economy of Chattanooga. Maybe the celebration on July 4, 1945 was a belated announcement that the State of Dade was ready to join Georgia culturally, physically and economically.

Whether the story had a true basis or not may be irrelevant. The story was believed by enough people so that it has become viable cultural folklore, which is almost as good as history. Besides, everybody really enjoyed the celebration.

Christian Priber's Cherokee Empire

Some one hundred years before the Cherokees were forced to leave Georgia, Christian Gottlieb Priber tried to organize them into an empire. The brilliant Priber, representing himself as a Jesuit priest, entered the territory in 1736.

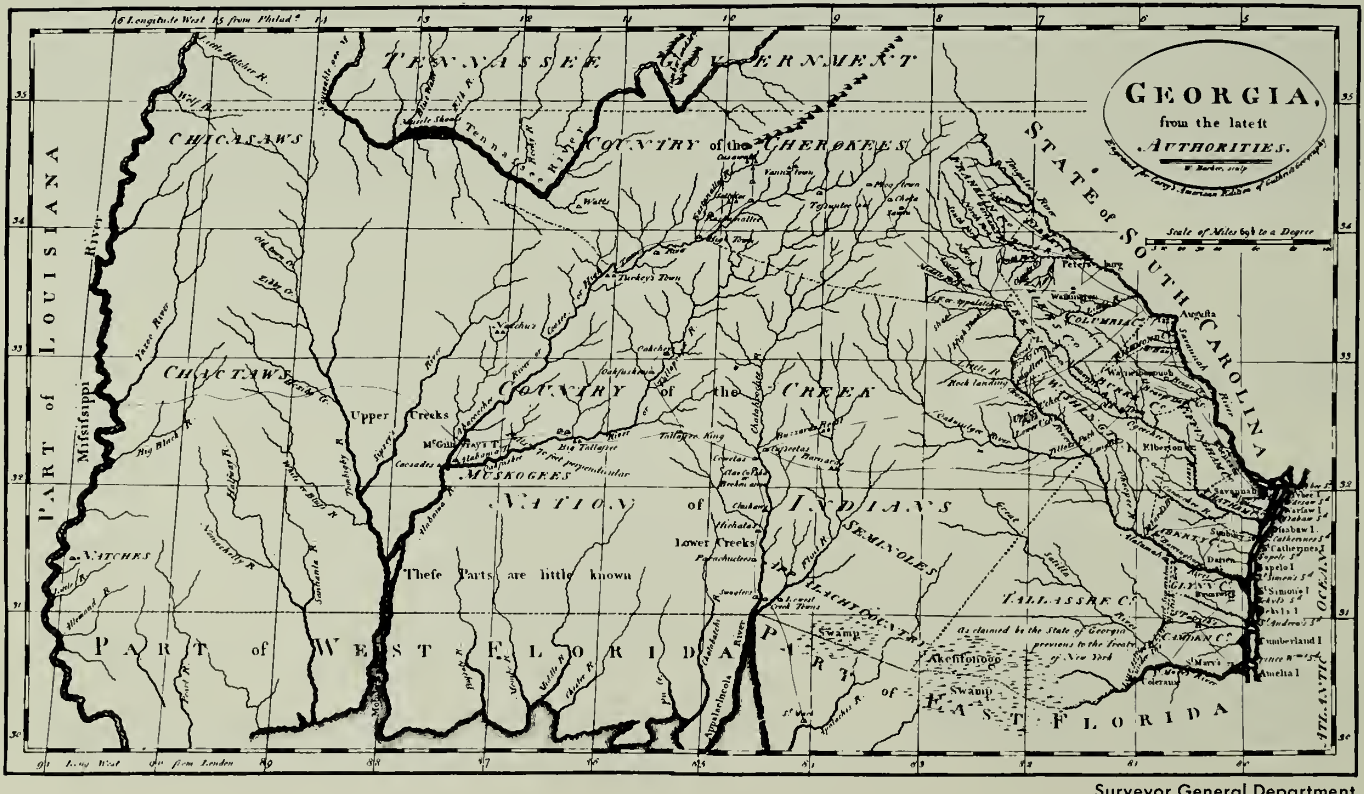
At the time England, France and Spain were struggling for control of the Southeast. Priber was working for France and possibly for Spain. He attempted to unify the Cherokees under an emperor with himself as the chief backstage string-puller. He nearly succeeded.

Before he completed his work, he was captured near Fort Toulouse, Alabama by English traders in 1739. Self-proclaimed as "His Majesty's Principal Secretary of State," he was taken to Frederica and imprisoned. Priber was no ordinary backwoods fanatic. He knew Latin, Greek, German, English, French, Spanish and had compiled a Cherokee dictionary. He died at Frederica sometime after 1744 and with him died his dreams of a communal utopia in the Cherokee territory. Nearly eighty years later the Cherokees did unite and form a sovereign nation, some of which was in Georgia.

Out-of-State Counties

Georgia was the last of the original thirteen colonies established and the charter set up some rather nebulous boundaries. The boundaries have been drastically changed. Otherwise we would have town names like Little Rock, Ft. Worth, Phoenix and Los Angeles on a state map of considerable width. When the western boundary shifted from the "South Seas" to the Mississippi River, Georgia still had a lot of room for growth so the legislature went about the business of setting up counties. In 1784 Houston County, located on the Tennessee River at Muscle Shoals (now Alabama) was established. This was all tied in with the giant scheme of establishing the State of Franklin, which was promoted by William Blount and John Sevier. County commissioners were appointed with power to lay out and grant land, but none was ever granted. In 1786 the first, Houston County, was dissolved and the State of Franklin soon followed that path.

The legislature was not content with one unattached county, so in 1785 Bourbon County was established near the juncture of the Mississippi and Yazoo Rivers just north of present day Jackson, Mississippi. The boundaries were located, county



Surveyor General Department

This 1795 map of Georgia (opposite) shows the state's western boundary extending to the Mississippi River. In the late 1700s, at least two Georgia counties were established in the area that is now Misissippi and Alabama. The photo at left captures the enthusiasm of Dade Countians in 1945 when Dade officially rejoined the Union.

officials were appointed but the land office was never actually opened. Due to the pressure from the Spanish in Natchez and an opportunity to make a little profit, the legislature abolished Bourbon (the county, not the branch water mixer) and sold the land to three land speculation companies. That and the ensuing actions led to the infamous Yazoo Land Fraud and the landmark Supreme Court case **Fletcher v. Peck.**

Georgia was the last state to cede her western lands in 1802 and then only in exchange for a promise by the federal government to remove all Indians from her lands. The eastern and northern boundaries were open to question then, and still are today.

The settlers in an area near the North Carolina, South Carolina, Georgia boundaries found that they were not attached to any state. A group from the headwaters of the French Broad River near the present Hendersonville, North Carolina petitioned the General Assembly, "to do to and for us as in their Wisdom think best." What the legislature thought best was to establish a new county. Thus Walton County was created and was represented in the Georgia legislature from 1804 to 1811. Andrew Ellicott's survey in 1811 located the northern boundary along the 35 degree parallel of north latitude and declared Walton County (in North Carolina) out of bounds. This ended Georgia's tendency to establish extra-boundary counties. The reader might want to check the latitude of Copperhill and Chattanooga, Tennessee, but that is another story.

Trans-Oconee Republic

While the boundary confusions were going on, there were questions about the interior of Georgia, too. In 1794 Elijah Clarke of Revolutionary fame decided that he and his group of land hungry followers would appropriate some of the unceded Creek Indian land. Clarke built Fort Advance, where he had a constitution drawn up and elected officials for his new republic. At the prodding of President Washington, Georgia officials forced Clarke's men out, burned his outposts and ended the brief existence of the Trans-Oconee Republic. See *Outdoors in Georgia* July 1976 or December 1977 for more details.

Name Changes

Georgia's placenames have a habit of changing whenever there is a need whether for aesthetic reasons—Jug Tavern to Winder, Chipley to Pine Mountain, Big Shanty to Kennesaw—or because conditions change. Counties have changed names, too. This sometimes happened when attitudes toward the namesake changed. One such instance happened when Lewis Cass, who had Cass County named for him, chose the "wrong" side to support during the "War of Northern Aggression." Devout Southerners changed the name of their county to the more suitable "Bartow" to memoralize General Frances S. Bartow who fell at First Manassas (First Bull Run to Yankee readers).

Another story that will not bear the scrutiny that Dr. Coulter gave to Dade is the one about Taliaferro County. The story goes that Colonel Benjamin Taliaferro fell from favor and there was a move to change the name of the county. The thrifty Taliaferroites decided that changing names, maps and records would be too expensive so they decided to just change the pronunciation. Hence it is now "Tolliver" county to those in the know. That surely is a good story — quick to tell, a Scotch-Irish tinge and a good touch of American common sense. This story could go far. Maybe someday it will even reach that solid state of history that the "State of Dade" or Mencken's bathtub has reached.

For more information the reader might check, "The Myth of Dade" in the December 1957 issue of the *Georgia Historical Quarterly* and *Georgia Counties: Their Changing Boundaries* by Mrs. Pat Bryant, Georgia Surveyor General Department, Atlanta, 1977. ●

the PINEY WOODS

land of hidden diversity

by Larry Niles
Wildlife Biologist
Photos by the Author

"Well, you know how it is down there, everything looks the same," the fellow from north Georgia said in speaking of my assignment to southeast Georgia. With that he added, "It's so boring and monotonus, how do you stand it?" At the time I had been a biologist for only a few months, and I liked both the place and the job. But I understood his opinion. It's a common one.

My "area" goes from the Okefenokee Swamp west to just past I-75, south to the Florida line and north to Douglas. The area is typical of an ecological forest classification called mesic pine lowlands. Much of southeast Georgia is in this classification. It's also only one forest type among several in the lower Coastal Plain physiographic region extending north to New Jersey, south through Florida and as far west as Texas.

In this section of Georgia only a few towns are any size and they are few and far between. A state highway map gives an accurate idea of the population density. On the average, 79 people inhabit each square mile in Georgia. In the 12 counties in this area, there are 30 people per square mile. Three counties have less than 10, and one, Echols County, has only five people per square mile. And it seems likely that they'll remain than way. Unlike the state population growth rate of +16.3%, seven of these counties have declined in population in recent years.

In a word, the land is wild. Pines dominate the forest. The major species are longleaf and slash, along with scattered loblolly, shortleaf and a few experimentals. Industry owns or leases the largest portion of the land, more than 70% in most counties, most of which is intensively managed for pole and pulp timber. The state owns Dixon Memorial State Forest, and the federal government owns the Okefenokee and a smaller tract near Valdosta. Single owners own the rest in small blocks, either farm or forest.

Walk into any southeastern pine forest and before long you'll come upon a swamp. A large portion of these flatwoods fills with water at one time or another. In his outstanding book on Georgia habitat types, *The Natural Environment of Georgia,* Charles Wharton recognizes nine types of swampland: bay swamps, cypress heads, herb bogs, cypress savannahs, gum ponds, shrub bogs, river bottomland, Carolina bays and the Okefenokee type swamp.

To most of us all pine forests look the same, but to wildlife it's a different story. Burning, crown closure, overstory age, drainage, understory and size of swamp area creates a wide variety of separate habitat types, many with distinctive wildlife species communities in these monotonous appearing forests.

Wildlife biologists often use the number of songbird species as a barometer of habitat diversity. In one study done in the southern coastal plain of Louisiana, researchers looked at the number of songbird species in four pine forest types: six years old, 20 years old, 46 years old, and an unmanaged stand of mature trees approximating the original "natural" pine forest. They not only found significant changes in bird species diversity but in production as well. For example, the mature "natural" stand had more than double the number of breeding species and six times the number of individuals than the six-year-old stand. Species composition differed with each forest type.

There is an incredible variety of species found in the swamps. Over 200 bird species have been sighted in the Okefenokee alone. Dr. Wharton states in his book that the single most valuable feature of southeastern swampland types is the incredibly diverse animal life found in them.

The list of mammals living here is quite lengthy. Bobcat, fox, otter, deer, skunk, raccoon, beaver, squirrel, rabbit, coyote, bear and even a few panthers have been sighted, some in numbers close to carrying capacity. In 1977, more fox, bobcat, otter

Here, the smoky veil that lingers after a controlled burning creates a surrealistic scene in the pine forests.

and raccoon hides came from Region VI, the southeast game management district, than any other region in the state.

Deer rank as an important wildlife resource in the southeast Georgia pine woods. The potential carrying capacity of deer in the lower Coastal Plain averages about 20 per square mile. This is lower than in the Piedmont, but about the same as in the mountain area. Actual local densities, of course, are lower. But on wildlife management areas and other areas protected from poaching and with only moderate land disturbances (clearcutting, etc.), densities are at least equal to that carrying capacity or higher.

Canoeing the many swamps and rivers is a popular activity in this area. Depending on the time of year, there are five canoeable rivers: Alapaha, Withlacoochee, Suwanee, Satilla and the Willacoochee, and many more small streams. These waters provide easy access to some of the most remote country in Georgia and some of its most endangered habitats.

Only a few decades ago, old pines carpeted this section of the southern coastal plain. Very few restrictions existed. Cows and hogs ranged freely, pines were valued for the naval stores they produced, and very little cutting was done. The land was nearly in the same condition as when William Bartram visited in the 1700s.

Since then a lot has changed. A growing demand for timber and the depletion of virgin timber lands in other areas encouraged the harvest of much of the virgin forest. Most of it was gone by the 1930s and 1940s. Low fertility and poor drainage prevented extensive agriculture. Most cut areas either regenerated naturally or were planted with pine seedlings.

Today few forests in this corner of Georgia can be considered mature timber. From 1957 to 1970 pulpwood production, primarily using young trees, increased almost 100%, while lumber production, which uses more mature trees, decreased about 50%. Obviously, then, young trees were being harvested before maturity. Another indicator of the great harvest of young age timber is the change in employment. Between 1962 and 1971 the number of people employed in the manufacturing of lumber and wood products declined 8.2%. In the same period pulp product employment increased 22.6%.

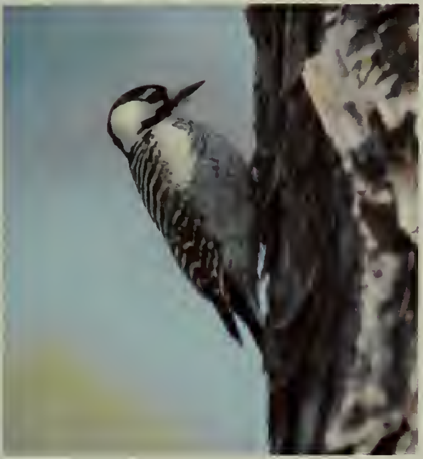
On timber company lands, pines are usually planted and cut on 20-30 year rotations. One forestry company holds a 66-year lease on a fairly extensive tract of land. They plan to get three crops of trees from that tract before the lease expires.

In southeast Georgia, the word is pine, and in lands devoted to intensive forestry they are planted everywhere. Swamp hardwoods are not usually worth the expense to harvest. Many acres are ditched and drained in order to create more pine habitat. Poor form and slow growth rates make dryland hardwoods unprofitable to harvest. Usually they are not even harvested to make way for pines but are girdled or poisoned and either left to rot or picked up and burned.

Considerable amounts of old growth pine and undisturbed swamp and ridge hardwoods fall to farmers and other small landowners each year. These forests are unproductive and consequently are cleared and/or drained to increase amounts of cropland. A projected 19 million acres of forest will be cleared for agricultural purposes by year 2000 in Georgia. This trend is apparent in southeast Georgia.

The immediate effect of intensive land management on wildlife populations depends on the species. Generally intensely managed short rotation commercial pine stands support less wildlife. On one study done in Florida, researchers discovered diversity and abundance of selected animal groups varied with intensity of forestry operations. As in the bird study mentioned previously, birds and small mammals fared better in unmanaged, older pine stands. In another project done in Florida, the same scientists found the rapid vegetational changes in intensively managed pine plantations may prevent animals from effectively utilizing the forest resources.

Some animals need one kind of habitat to survive. The red-cockaded woodpecker, an endangered species, requires old-age pine stands for nest-



Many wildlife species, from white-tail deer to endangered species like the red-cockaded woodpecker, inhabit southeast Georgia.

ing and forage sites. Squirrels need hardwood stands for most of their nesting and food requirements.

Many species do best in a variety of stand types. Different types provide food and cover at different times. Deer will use the tremendous amounts of browse and herbage in clearcuts in the summer but will use hardwood mast in the fall if such areas are available.

However, unmanaged land is not necessarily the most productive for wildlife. Controlled burning, a necessary tool of managed pine stands, increases available food for many wildlife species. Even William Bartram in the predevelopment days of the 1700s noted more animal activity near human settlements. But the negative effects of intensive land use can be boiled down to two: the elimination of unique habitat types such as swamps and corresponding wildlife populations, and the overall reduction of habitat diversity. This is accompanied by a reduction of wildlife diversity and in some cases reduced carrying capacity.

The economic pressures of today dictate a need for intensive land management. Human need for food and fiber is increasing because of a larger population and a growing consumption rate per individual.

Land is more valuable and productive now. As of 1971, the average price per acre of Georgia farmland had increased more than 73% since 1976 and over 900% since 1932. The 73% increase was greater than any other state in the same time period. Peanut yields, the number one cash crop in Georgia, have climbed from 665 pounds acre in 1930 to 3490 pounds acre in 1971. Heavier and more efficient equipment has enabled the forestry industry to use fewer men and still prepare, maintain and harvest tremendous amounts of timber. Many practices, such as swamp drainage, were economically impossible without today's machines.

With demand as justification and the technology to make it feasible, any land management practice can be implemented. But economics often dictate what management practices are applied.

Taxes play a major role. Most county governments tax all land whether swamp or superior cropland. The land type determines the amount. Cropland has the highest value followed by pasture, good forest land, poor forest land, and finally "waste" (swamps, etc.). A land manager must pay taxes on land, whether it produces thousands in crops or timber or whether it produces nothing, as in swamps. In addition, state law determined timber is taxable and most counties increase assessed value of timber with increasing age. In one county the difference can be as much as 800%.

Since only the land is taxed, it is more profitable for farmers to convert woodlands to pasture or cropland, especially since a woodlot, managed or not, will only cause greater tax payments. For the same reason foresters find it to their advantage to maintain a forest at young ages. Old-age pine timber and swampland may have greater wildlife benefits, but they also cost more in taxes.

Money management determines a large part of land management. Investments in machinery, leased land, buildings, taxes, and the tremendous amount of loaned money demands farmers and foresters be competent businessmen. Small farms disappear and larger ones able to stand the financial pressure replace them. Between 1930 and 1960 the number of farmers decreased 58%, but farms increased in average size from 86.4 acres to 184.8 acres.

Many forestry companies are accountable to stockholders whose major concern is a dividend. A planted pine forest is actually only one more corporate investment. Interest accumulates on the money spent to plant and maintain that forest. Short-rotation harvests keep accruing interest low. From a corporate viewpoint, maintaining vast acreages in young, monotonous pine plantations is perfectly justifiable.

The exploitation of the southeast pine forest is complex. Attitudes toward the land, the unlimited demand, available technology, tax structures, and today's money market dictate the nature and degree of utilization. The final plan involves everyone: foresters, farmers, bankers, politicians, scientists and the general public. To some the possibility of ecological disaster may be enough to justify restraint, but the stakes are high. This piece of the South has no giant redwoods or fragile tundras to capture our eyes and heart. There is very little incentive to alter the direction of exploitation. The choice between restricted exploitation and profits and jobs is a hard one, particularly if they are your profits and jobs. ●

Natural Areas Program

by Mary Anne Neville-Young

The last several issues of OIG have featured articles on Georgia's protected species. A key factor in conservation of endangered and threatened wildlife and plants is the proper management of their habitat. The concept of natural areas is intimately linked to preservation of protected species while preserving other values in Georgia, as well. This month's discussion on Georgia's Natural Areas Program explains how the state is conserving precious natural resources through habitat protection.

The preservation of natural values and natural diversity has become more than the dream of a few individuals. Since the environmental movement so apparent in the 1960s, attempts to awaken society to our diminishing resources resulted in the passage of significant state and federal legislation.

In 1966, the desire to retain a portion of Georgia's natural heritage moved the Georgia General Assembly to pass the State Council for the Preservation of Natural Areas Act. Under this law, a Natural Areas Council was created and was assigned the function of identifying "natural areas" and securing preservation for them.

In 1972, the Natural Areas Council was eliminated, and its functions were transferred to the newly formed Department of Natural Resources. The Natural Areas Program is now administered by the department's Game and Fish Division.

What is a natural area? As defined under Georgia law, a natural area is a "tract of land in its natural state which may be set aside and permanently protected or managed for the purpose of the preservation of native plant or animal communities or any other natural features of significant, scientific, educational, geological, ecological or scenic value."

The term "natural area" is broad and can be misleading. Unfortunately it has sometimes been incorrectly applied to areas with particular aesthetic appeals which were in no way officially protected or managed. Since "natural area" is a legal term, sites which are so designated must first undergo specific evaluation procedures to assess their significance. In simplified form, some of the criteria which a site must meet to qualify as a natural area include the following:

.... an outstanding example of an aquatic habitat
.... an outstanding example of a biotic community
.... a habitat for a rare or endangered species of plant or wildlife
.... an outstanding geological example
.... an outstanding scenic area

Paramount in the objectives of the Natural Areas Program is the obvious need to preserve significant areas which are somehow threatened with loss of integrity. Inherent in the preservation process is the need to foster an interest in, and a recognition of, areas worthy of preservation. Therefore, goals of the Natural Areas Program include acquainting local governments, private citizens, corporations and other agencies with the natural areas concept, to encourage not only volunteer protection of these areas, but consideration of them in governmental and private planning processes.

Sites which receive official recognition as natural areas are added to the State Registry of Natural Areas. Such sites have been evaluated by the Natural Areas Program staff and determined to be worthy of preservation. At this point, one of several possible methods of resource protection are sought.

The most desirable form of natural area protection is that done on a volunteer basis. Using this procedure, the department cooperates with landowners to establish management procedures which will maintain the integrity of the area. Other procedures for protection might include conservation easements, Heritage Trust Natural Area Grants to local governments, and actual acquisition by the state. The latter would be negotiated through the Heritage Trust Program, which acquires all land for the department.

The Natural Areas Program constantly undertakes extensive field work to identify areas of significance which could possibly qualify for state registration. Public familiarity with the natural areas concept will greatly help the program to identify areas suitable for registration. Continued cooperation between agencies and individuals will ensure that the goal of preserving natural values and natural diversity is realistic as well as attainable. ●

cattle egret

african immigrant

by George Leposky
Photos by Ron Childress

George Leposky is a freelance science writer from Miami, Florida. Ron Childress is a wildlife photographer living in Lawrenceville, Georgia.

A feathered foreigner, traveling practically around the world on his appetite, has set up housekeeping in Georgia.

He's the cattle egret, a native of Africa. Just how he got from there to here is a bit of a mystery, but in the past two decades this avian jetsetter has descended on much of the United States.

As his name implies, there's a pretty good chance you'll find the cattle egret hanging around a herd of cows. That may seem like strange company for any self-respecting bird to keep, but this one knows what he's doing—getting an easy meal.

As the cows graze, their hooves flush from hiding many insects, frogs, mice and other small varmints which live in the grass. These tiny creatures comprise the cattle egret's diet. They're more difficult to see when they're sitting quietly than when they're disturbed and on the move.

The cattle egret is a strutting dandy in white plumage, standing about two feet tall on vivid yellow legs. He has a long, spearlike yellow bill. During the spring breeding season, both sexes wear buff-colored plumes on head, breast and back. The legs turn a deep ruby color and the bill becomes bright red with a white tip.

By comparison, the native snowy egret has a generally slimmer appearance, and its legs and bill are black. Also, the snowy's breeding plumage is white. Another native white egret found in this region, the American egret, is almost twice as big as either the snowy or cattle egret.

Cattle egrets are most easily seen in Georgia along the coastal plain during the spring nesting season. Places where they've established large rookeries include the Okefenokee Swamp and the Twin City and Valdosta areas.

According to Leonard Walker, a U.S. Fish and Wildlife Service biologist working at the University of Georgia, these creatures pose a threat to aircraft operations at Moody Air Force Base outside Valdosta.

"The cattle egrets roost in a nearby swamp and feed along the runways," Walker reports. "Jet trainers fly there every day. The birds haven't caused any crashes yet, but the folks at the base are scared to death."

After raising their families, the birds roam into the Piedmont region of the state. During late summer and fall you're most likely to encounter them in pastures south of Interstate 20 from Covington eastward, and east of Interstate 75 from Macon southward. Occasionally they do turn up on the southeastern edge of the Atlanta metropolitan area.

Walker says most of Georgia's cattle egret population takes a winter vacation in Florida from November to March. Most—but not all. Six winters ago George Sturgis, a science consultant for the state Board of Education, encountered a lone egret trudging along Interstate 75 south of Macon in 16-degree weather.

This invasion of cattle egrets is by no means confined to Georgia. The species is now established in North, Central and South America, Europe, South Africa, the Asian steppes and even Australia.

Fossil remains dating from the Pleistocene Epoch indicate that the cattle egret has been following large hoofed mammals around the grasslands of central Africa for tens of thousands of years. In recent times the cattle egret population "exploded" for reasons unknown, colonizing territories separated from the ancestral homeland by vast reaches of ocean or inhospitable terrain.

There are no records of cattle egrets escaping from zoos or being harbored by ship captains. Thus it appears that the species reached the Western Hemisphere on its own. If this is true, it would make the cattle egret the only Old World bird to gain a successful foothold in the New World in modern times without man's obvious assistance.

The distance across the Atlantic Ocean from the bulge of West Africa to northeastern South America is more than 1,700 miles. For even a strong flier like the cattle egret to fly so far boggles the imagination. Still, in the absence of any other explanation, most scholars have concluded that this Columbus of the bird world did indeed fly across the Atlantic, assisted perhaps by storms or westerly trade winds.

A specimen shot in British Guiana in 1931 provided the first foolproof documentation of the cattle egret's presence in the New World, although naturalists in South America had recorded sightings in their dairies as early as 1877. Over the years the species moved northward through the Caribbean, ultimately reaching the United States.

A good birder always looks twice at a familiar species to be sure he's seeing what he thinks he's seeing. One day in 1948 William H. Drury, a professional ornithologist, and Alan Morgan, an insurance salesman who later became executive director of the Massachusetts Audubon Society, spotted a white bird prancing among a herd of heifers near Sudbury, Massachusetts.

Drury and Morgan rubbed their eyes in disbelief—but they *were* seeing a cattle egret. Armed with a shotgun and a federal collecting permit, they dispatched the bird to a resting place in the Harvard museum and earned themselves a place in the annals of ornithology.

When word of the find was published, many other birders were ready to kick themselves. One was Richard Borden of Concord, Mass., who got out some old photographs he had taken in Florida at the beginning of World War II. Borden had captured on film some birds which looked suspiciously like cattle egrets. Dr. Andrew J. Meyerriecks, an ornithology professor at the University of South Florida, says the species may have been in Florida, unrecognized, as early as the 1930s.

In 1953 the first cattle egret nest in North America was discovered near Clewiston, Florida, at the south end of Lake Okeechobee. Two years later over 1,000 pairs were nesting there. Leonard Walker says nesting in Georgia began at Okefenokee Swamp in 1961. The species has since bred in Ontario and the Great Valley of California, and Meyerriecks predicts a huge increase in its numbers as it becomes fully established in the cattle-producing states of the Great Plains.

Meyerriecks conducted banding experiments on young cattle egrets in Florida several years ago. He found most hatchlings remaining near the nest during their first summer of life, but a few dispersed and were seen many miles from their hatching place. Then they migrated back to Florida for their first winter. Meyerriecks suspects that these roamers returned to new colonies the next year to breed. Thus, he theorizes, the cattle egret may expand its range by fanning out from centers of abundance such as Florida.

Some ornithologists have expressed concern that the cattle egret might crowd out our native herons. This doesn't seem to be happening. Dr. William J. Weber, a veterinarian who studied a Florida rookery, found cattle egrets nesting in compact colonies, leaving plenty of breeding room for other species. He also observed amicable relationships between neighbors of different species, even when their nests were less than a foot apart.

There seems to be no real competition for food, either. Although cattle egrets have been observed wading through marshes like other herons in search of fish, frogs and snakes, the cattle egret's dinner table is usually a cow pasture. Mike Fogarty, a biologist with the Florida Game and Fresh Water Fish Commission, has analyzed the stomach contents of 1,000 cattle egrets and determined that 99.8 per cent of the birds' diet consisted of invertebrates. Grasshoppers, crickets, spiders, flies and beetles predominated. Fogarty found none of the fish on which native herons depend heavily for food.

The cattle egret's "associative feeding behavior" is the key to his success on this diet of tiny invertebrates. Researchers have counted the footsteps taken by foraging cattle egrets, and the number of prey they've captured. These studies show that the cattle egret expends less energy in food-gathering when he's eating "in association" than when dining alone.

"The bird is most commonly found with cows," Dr. Meyerriecks notes, "but he'll associate with anything—horses, tractors, even himself. I've seen groups of cattle egrets leapfrogging over each other as they work their way across a field. Those in front will stir up insects for the ones in back."

The cows don't seem to mind the avian company—and they may even welcome it. Dr. Meyerriecks once observed a bull sitting and chewing its cud. Periodically the bull would turn its head toward a nearby cattle egret, flare its nostrils and allow the bird to poke its bill in and gobble up flies.

In my own observation of cattle egrets, I've noted another quirk in their feeding behavior: animosity between egrets on the left and right sides of a cow. Each bird defends its own side against threats of trespass, an effort made more complex and comical by the movements of the cow—and therefore of the feeding territory.

The cattle egret's feeding habits help to explain why the species has adapted so readily in so many parts of the world. This bird has chosen for itself an ecological niche—cattle-following—which really hasn't been occupied in grassland areas outside Africa.

In North America, man has actually created the conditions cattle egrets like. There were few large hoofed mammals in Florida except deer (which spend most of their time in forests) until settlers brought in horses and cattle. To the north and west of Florida, a large expanse of woodland separated the seacoast from the vast herds of antelope and bison on the Great Plains. However, even if cattle egrets had reached that region, they would have found a scarcity of water and nesting sites. Reservoirs and planted trees have made the Plains a much more desirable heron habitat now.

Thus, it is only within the last century or two that North America has become suitable for colonization by cattle egrets.

One can't help wondering how the birds knew when green pastures had been prepared for them here. It's possible that the cattle egret has always had a wanderlust, and we just never heard about the birds who didn't make it, or who made it before North America was ready for them.

In any case, the cattle egret has now arrived. We should welcome his graceful beauty and appreciate his beneficial eating habits. ●

A River to Call Your Own

by Sid Johnson
Photos by the Author

The Oconee is my river. It has been my river all my life. I have known its moods, its sense of history, its people and its geography, Even my love for it seems to be part of the cycle of its own life—and mine.

Everyone needs a river to call his own. A river that is to him personal and private regardless of the number of other people who find enjoyment in it. A river can be a refuge, but only to the point that it demonstrates those same demands of labor, constancy and perserverance from which we seek refuge. A river can be a place of recreation, but only to the point that it restores the capacities of heart and mind and soul which need to be restored.

But how do you make a river your own? In what manner of courtship do you engage? What intimacies should be shared? What secrets may be revealed? What is the process by which you and the river experience a unity which will last through separation, doubt and frustration.?

If the river is to be your own, it must be your own in totality. It must be the sum of its parts not a collection of individual parts to be dissected, analyzed, evaluated. To study the hydrology of the river may create great knowledge about its sources of water, its movements and currents, its absorption rates and discharge levels; but that makes the hydrology — not the river — your own. To analyze the ecology of the river may provide detailed information on the life cycles and balances, predatory orders and productive phenomena, but that makes the ecology — not the river — your own. The river must be accepted for what it is, perceived as a whole, and not distorted by enlargement of any of its features at the expense of others.

The river seems to exist in a sense of history. For most of us, a river is a few miles of channel, swamp and bluff, bends, bights and elbows — all its qualities and characteristics compressed into a brief expression of time and space. Beyond those few miles, most of us know little of what comes before or what will come after. Even those of us who think we know something of the river must admit that the extent of our knowledge is, for the most part, an expression of our own definition of what the river is.

The Oconee River flows through or alongside 16 counties on its way to meet the Ocmulgee and form the Altamaha. Its major political significance today is to mark the boundary lines between most of those counties and occasionally confound tax assessors by abruptly creating islands where there were none before.

We tend to think of the Oconee as merely part of the Georgia landscape. But until 1790 — 14 years after independence — the state of Georgia did not extend as far west as the Oconee. In 1802, while President Jefferson was making delicate inquiries as to whether France would be willing to sell New Orleans and West Florida, a treaty was being negotiated with the Creeks which brought under Georgia jurisdiction a narrow stretch of land west of the Oconee. That new territory extended roughly from Dublin to Watkinsville, but on the west side of the river. Finally in 1804, when the Creeks ceded the remaining territory east of the Ocmulgee, the Oconee lay entirely within Georgia boundaries.

When the vast territory between the Ogeechee and the Oconee became Georgia domain, two counties were created. Their names were Franklin and Washington. Washington County extended from Liberty County on the south to Cherokee Corner, between present day Athens and Lexington, on the north. Franklin County covered the remainder of the western part of the state.

Gradually, as the population grew and conditions became settled, the huge counties of Washington and Franklin began to be divided into more manageable political subdivisions. From Washington, Greene County was created in 1786 and Montgomery County was created in 1793. Jackson County was created from Franklin in 1796. From Jackson, Clarke was created in 1801.

With the Indian cessions in 1802 and 1804, the land between the Oconee and the Ocmulgee was formed into two counties — Baldwin on the north, Wilkinson on the south. In 1807, while Aaron Burr was being tried for treason, three new counties were being created on the west bank of the Oconee: Laurens from Wilkinson; Morgan and Putnam from Baldwin.

No new counties were created along the Oconee until 1818. That was a year of general excitement and concern in the country. James Monroe was president in Washington and William Rabun was governor of Georgia. Inflation was rampant, presaging a financial panic and depression early the following year. Illinois was admitted to the Union and a part of the Missouri Territory applied for admission. Andrew Jackson invaded Spanish Florida and kept political intrigue and turmoil stirring in the southern part of Georgia and in Florida. That year of 1818 also saw the creation of Hall County from the new Creek land cessions. Hall was the last of the original counties to be created on the Oconee.

The remainder of the Oconee counties were a long time in forming. Johnson County was created from Emanuel. Laurens and Washington in 1858, a time when emotions were running high over the volatile issues which precipitated the Civil War, while on a calmer note, Henry Wadsworth Longfellow published a long narrative poem, "The Courtship of Miles Standish."

Oconee County was created from Clarke in 1875—a year when the "Molly Maguires", a secret labor union, mounted terroristic attacks against Pennsylvania coal mines; when the cattle drives of the beef-cattle industry of the Great Plains were reaching their peak, making famous such names as

Dodge City, Abilene, Ellsworth, Wichita and Hays City; when a new horse race was begun at Churchill Downs called simply the "Kentucky Derby."

After the turn of the century, Montgomery was subdivided into Wheeler in 1912 and Treutlen in 1917.

The Oconee-related counties were 133 years reaching their present state. Some of the counties which originally were Oconee counties no longer touch the river. Their boundaries have changed often and the people have been moved from county to county without ever having left home. The families who settled the Oconee region have farmed their lands, felled their timber, built their homes without much regard for the magic of county boundaries. And the Oconee, with quiet and amused indulgence, has gone about its business, watching the antics of political stagehands moving county lines like scenery in a great drama, awaiting leading roles for which they were never called.

One of the great mysteries of the English language is the use of the word "improvement" to describe man's efforts to alter the works of nature. Nature apparently doesn't consider such efforts to be improvements since she relentlessly tries to restore her original conditions. The term apparently relates to man's perception of his own condition and he must constantly struggle to maintain his "improved" condition.

Historically, two general categories of improvements have had a direct and continuing effect on the quality and character of the Oconee. First is the improvement of the river itself for navigation purposes. As early as 1763, the colony appropriated funds for clearing navigable rivers. The first appropriation for the improvement of the Oconee was made in 1815. There was created the Commission for Improvement of the Oconee River which had the responsibility of overseeing the affairs of navigation. By 1842, the commission had expended $45,000 in keeping the channel clear for commerce.

The Oconee touches 16 counties on its way to meet the Ocmulgee and form the Altamaha. Along its banks is a microcosm of south Georgia landscape and lifestyle.

The greater portion of the Commission's work was directed at a 28 mile portion of the river from Dublin north to the Central of Georgia Railroad bridge. Between 1874-1885, the Oconee Steamboat Company expended $8,575 improving the same area.

The federal government extended its active interest in navigable streams to the Oconee in 1875 and subsequently appropriated $45,000 for improvements. The Oconee project sought to provide a channel of three feet at ordinary summer low water from Milledgeville to the Forks—a distance of 145 river miles—at a cost of $170,000 with annual maintainence costs estimated at $4,000. Two specific appropriations were made to clear out the river over a 17 mile segment between the northern boundary of Greene County south to the Georgia Railroad bridge at the confluence of the Apalachee River between Carey and Swords. However Milledgeville, situated on the fall line, was determined to be the practical head of navigation and all other expenditures were applied to the river south of Milledgeville.

The improvements to which all of these efforts were directed were the removal of snags and stumps from the channel; removal of stone from shoals; and removal of sand, clay and gravel from cut-offs, false points and shoals. In some instances training walls, spur dams and bank reventments were constructed.

The second type of improvement which affected the Oconee was the clearing of timber from the adjacent land area. The Oconee drains approximately 5,200 square miles. Originally, this entire area was heavily forested, but the temptation of commercial timbering combined with general ignorance of responsible conservation practices resulted in substantial removal of the forest cover.

Prior to the Civil War, about 25 million board feet were cut annually and rafted down the Altamaha system to market at Darien. There was little timber business during and after the war, but by 1870 and until around the turn of the century, the annual mean timber production along the rivers was some 60 million board feet. After that time, the rivers played a decreasingly significant role in the timber industry.

Before the forest removal, all three rivers of the Altamaha system were clear, but with great amounts of soil — particularly clay — going into the rivers, they gradually gained their characteristic red color for which they are known today. As late as 1840, when timbering along the Oconee was more advanced than along the Ocmulgee, residents along the Altamaha could tell whether a freshet had originated on the Oconee or the Ocmulgee by the color of the rising water.

River clearing and timbering actually fed on each other. The more work done on the river to make it suitable for commerce, the greater timber rafting was facilitated. The more timber was cut from the adjacent land area, the more clearing work had to be done in the river. Drainage run-off carried soil which made bars and produced cuts and cut-offs. Accelerated flow cut banks more quickly causing the river to receive dislocated trees and other snagging debris. The process became an increasingly predictable cycle.

The coming of rail and highway transportation made continued use of the Oconee impractical as a commercial thoroughfare. Nature rapidly began her own improvement program to restore the river, as best she could, to her original design. However, the effects of the improvement cycle have remained demonstrable long after the river has ceased to have any significant commercial value. But nature thwarted man's efforts to achieve his greatest navigation dream for the Oconee. He could never establish and maintain a consistent, reliable channel three feet deep at summer's low water.

Knowledge about anything begins with curiosity. Awareness is germinated in the split-second when a thought is followed by "I wonder. . . ." My own knowledge and awareness of things about the Oconee River has come from places or events or people in some way connected with the river. My first conscious wonderings about the river had to do with hearing names like Steamboat Bight, Frying Pan Cut and Bonny Clabber Bluff.

There are a lot of things that I wonder about the Oconee River. These are some of the things I wonder about — what I call "Wonders of the Oconee."

PLACE NAMES

I wonder how the places along the river got their names. Those names associated with families are pretty easy to run down. But how about the others? Names like Polly's Cut, Double Lapsys, Shortwrestle (and Longwrestle) Jack Bight, Squirrel Jump, Wring Jaw Bight, Goat Island and Kiss-me-quick Bend? Is Bonny Clabber really from a Welsh word (Baunauclaughbaugh) meaning "cottage cheese"? If it is, what does cottage cheese have to do with that part of the Oconee in Laurens-Treutlen called Bonny Clabber? What are the other place names that have been forgotten, now that river traffic is left mainly to fishermen and hunters?

STEAMBOATS

I wonder about the steamboats that puffed up and down the Oconee. I've heard they ran from Milledgeville to Darien. I've also heard that the average steamboat run was not more than 30 to 40 miles, primarily connecting towns and settlements with the railroads. What were the highest number of steamboats ever in service on the Oconee at one time? Who were the captains of the steamboats? Where did they live? What was the last steamboat to run on the Oconee? Who was her captain?

WELLS

I wonder about artesian wells, that great source of fresh water to the parched and weary traveler. How many good flowing wells are there within an easy walk of the Oconee's banks? I've visited only two but have heard of others. Where are they located? Are they still flowing?

INDIANS

I wonder about the Indians who once inhabited the Oconee region. Evidences of their culture and activity have been found in several places. There were towns below Milledgeville at Rock Landing and below Dublin. There are mounds in Greene County and Putnam County. But what about other evidences of Indian settlements which have received little or no attention because of the greater prominence of others?

RIVER PEOPLE

I wonder about river people—that special breed who make a living out of the unique abundance of the river system, or perhaps just spend a lot of their time at the river. Who are the men in the Oconee counties who know more about the river and its moods and its places than anyone else? Who would you go to for help if you had to find a person or animal that you thought was lost in the river swamp? Who are the ones whose reputation for an intimacy with the river has endured beyond their lifetimes? What stories are told about their exploits and adventures?

GREATEST WONDER

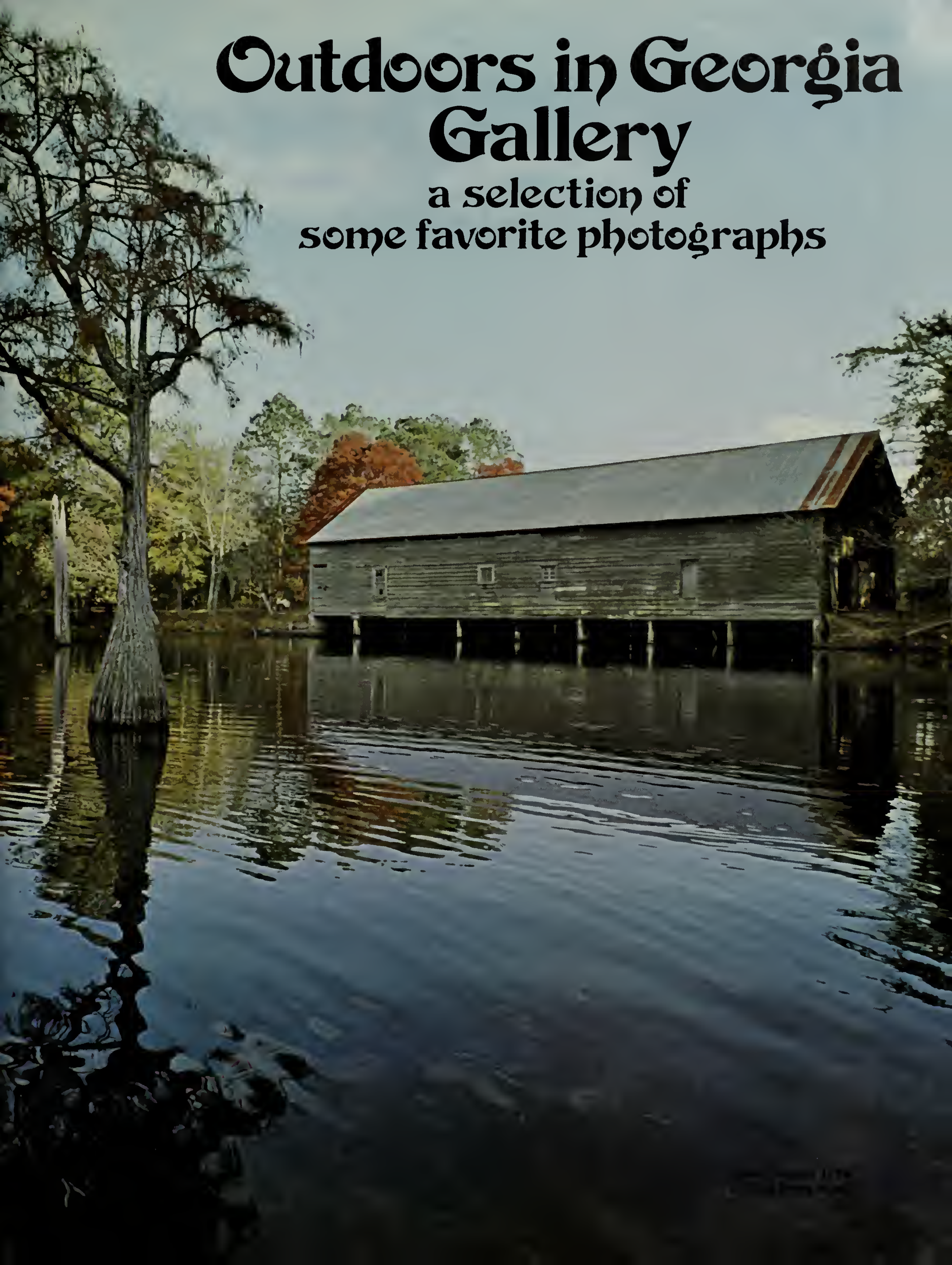
And the greatest wonder of them all: I wonder if I'll ever find the people who hold the answers to these questions as a part of their own being. There are many people whose family and personal consciousness extends to the Oconee River just as mine does—people who clearly see parts of the river, its vastness that others have not had the opportunity to know. I wonder if these people — you — will share their knowledge with me by writing to me at Suite 518, 2200 Century Parkway, N.E., Atlanta, GA 30345.

Maybe it's your river, too. ●

Sid Johnson is an attorney who now lives in DeKalb County. A series of his articles about the Oconee, from which excerpts are printed here, was published in several south Georgia newspapers.

Outdoors in Georgia Gallery

a selection of some favorite photographs



Opposite page: "**Strolling the Squares of Savannah,**" July 1978 by Bill Wood
"**The Beach,**" February 1975 by Jim Couch
"**Saltwater Records,**" February 1977 by Jim Couch
"**Oconee Journal,**" July 1976 by Bob Busby
"**A Park for All Seasons,**" October 1976 by Jingle Davis

This page: **"Prince of Game Birds,"** September/October 1977 by Bob Busby
"Getting Ready for Quail," October 1978 by Bob Busby
Opposite page: Cover, November 1976; **"Legal at Last," "Guns and Loads for Dove,"** both from September/October 1977;
"About Duck Hunting in Georgia and Other Things," November 1976. All photos by Bob Busby.

"Heritage Trust," January 1974

"Coastal Choice (editorial), February 1976 by Jim Couch

"Traveler's Rest," July 1975 by Bob Busby

"Close-up Photography," August 1975 by Bob Busby

"Season of the Warrior," October 1976 by Bob Busby

And the night shall be filled with music,
And the cares that infest the day
Shall fold their tents like the Arabs,
And as silently steal away.
—Henry Wadsworth Longfellow

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